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Forest Service Pacific
Northwest Region

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# DRAFT ENVIRONMENTAL IMPACT STATEMENT

# TOLLGATE FUELS REDUCTION PROJECT

**Umatilla National Forest**
**Walla Walla Ranger District**

**Umatilla and Union Counties, Oregon**

| | |
|---|---|
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**Abstract:** The USDA Forest Service is preparing a Draft Environmental Impact Statement (DEIS) for the Tollgate Fuels Reduction Project. The Tollgate Project proposes surface and canopy hazardous fuels reduction activities to modify potential wildfire behavior within portions of the Tollgate project planning area on Walla Walla Ranger District. Three Alternatives are analyzed, including the No Action Alternative (Alternative A). Alternative B, the Proposed Action and Preferred Alternative, includes forest thinning activities across 4,330 acres. Alternative C includes forest thinning activities across approximately 4,010 acres. Both action Alternatives include road maintenance and re-alignment activities to support removal of timber and other merchantable biomass products. A Forest Plan amendment is proposed to allow for mechanical fuels reduction activities to occur within selected Pacfish Riparian Habitat Conservation Areas of high strategic importance for wildfire hazard mitigation.

**Internet web address:** **http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=28356**

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# SUMMARY

## INTRODUCTION

The Forest Service has prepared this draft Environmental Impact Statement (DEIS) for the Tollgate Fuels Reduction project. The Tollgate Fuels Reduction Project is conducted as a Healthy Forest Restoration Act (HFRA) authorized fuels reduction project. The Tollgate Fuels Reduction Project occurs within the Upper 204/Tollgate Wildland Urban Interface (WUI) identified in the Umatilla County Community Wildfire Protection Plan (CWPP) as amended. The Tollgate project began with the initial objective to reduce fuels and provide protection to private property and vital infrastructure that occurs within the area. The Forest Service utilized a collaborative process to help further define the objectives of the project and begin formulating the types of activities which would be used to achieve those objectives.

Additional analysis identified a need to amend the Umatilla National Forest Land and Resource Management Plan (LRMP, also known as Forest Plan) to allow treatment activities to occur within selected Pacfish Riparian Habitat Conservation Areas (RHCAs) in a manner that may not be consistent with the Riparian Management Objectives originally defined in Pacfish . On September 6, 2011, a second Notice of Intent appeared in the Federal Register that reintroduced the Tollgate Fuels Reduction Project and included identification that an amendment to the Forest Plan would be prepared in conjunction with this action. Additionally, public input on the revised Tollgate proposal was solicited by a second round of mailings to interested parties.

## LOCATION AND AREA

The Tollgate project planning area is approximately 46,000 acres in size and is located on Walla Walla Ranger District mainly in Umatilla County, Oregon with a small portion in Union County, Oregon (Appendix A, Map A1). Portions of the Lookingglass inventoried Roadless area (IRA), Walla Walla River IRA and North Fork Umatilla Wilderness occur within the Tollgate project planning area.

## PURPOSE AND NEED FOR ACTION

The Tollgate community is situated on a high plateau between the North Fork Umatilla Wilderness and South Fork of the Walla Walla River. The Tollgate plateau is surrounded on all sides by very steep, and deep, inaccessible canyons (Appendix A, MapA2). The plateau is generally characterized by mixed to high-severity fire regimes. Private lands and inholdings are adjacent to, and interspersed with, National Forest System (NFS) lands.

In many cases on other NFS lands, Wilderness and Roadless areas occur at higher elevations and are well removed from communities. The Tollgate plateau, however, sits above large tracts of both Roadless and Wilderness areas. Preliminary analysis indicates that wildfires may initiate in these remote places, gain uncontrollable intensity, and ultimately emerge onto the plateau with firebrand spotting distances of up to 1 or 2 miles into the Tollgate WUI. During most fire seasons, the geographic positioning of the Tollgate WUI relative to large tracts of remote and inaccessible Roadless and Wilderness areas places it at considerable risk of high-severity, high-intensity wildfires moving into and through the area. These wildfire risks threaten many important values identified in the Umatilla County CWPP:

1. *Residences*- There are approximately 370 residences within the Upper 204/Tollgate WUI. There are 43 privately owned cabins under Forest Service special use permit and the Spout Springs Ski Resort is also within the project planning area (Appendix A, MapA2).

2. *Local and Regional Infrastructure*: There is infrastructure that occurs throughout the area that holds both local and regional importance to various surrounding communities. There are fiber optic lines, telephone lines, power transmission lines, power distribution lines, communications equipment and scientific sampling devices (Appendix A, MapA2). The Tollgate community is bisected by Oregon State Highway 204. This highway serves as a major transportation route for shipping commercial goods and people. The highway connects the communities of Elgin, OR in the south to Milton-Freewater, OR and in the north, Pendleton, OR (Appendix A, Map A1).
3. *Forest Service infrastructure*: There are 4 Forest Service campgrounds, 6 trailheads, 4 snowparks and other Forest Service facilities (such as the Tollgate Work Center and Tollgate Visitor Center).
4. *Public Health and Safety:* Given the high amount of recreational use seen by the area, a wildland fire event would likely cause serious threat to human life (both residents and wildland fire responders) as well as property. In such an event, fire managers expect that a large number of resources (personnel and financial) would be expended in fire suppression operations in the area. Given the areas current vegetative conditions this would constitute increased risk due to the amount of personnel hours spent on suppression activities.

Consistent with the Umatilla County CWPP and Umatilla Forest Plan, the desired condition for the Tollgate planning area is a WUI area generally characterized by fuel profiles with a low likelihood of active crown fire, and which are thereby suitable for:

- Direct wildfire control and suppression under all but the most extreme circumstances
- Safe ingress and egress within the Tollgate WUI during wildfire events
- Protection (by firefighters and firefighting resources) of identified Values at Risk from wildfire-caused injury, loss of life, property damage, or destruction

Existing fuel loading in the Tollgate WUI are not consistent with these desired conditions. Throughout most areas in the Tollgate vicinity, fuel loading, arrangement, and continuity are not suitable for direct wildfire attack and suppression under typical fire weather and fuel moisture conditions. Safe ingress and egress would not be possible during wildfire events where crown fire is likely to occur—which is presently along most travel routes within the Tollgate WUI. Finally, crown fire is expected in many areas (including most areas surrounding private property and other infrastructure) throughout the majority of the normal fire season.

The need for action in the Tollgate area is based upon difference between existing and desired conditions with respect to fuel levels, associated potential wildfire behavior, and related risks to the values identified above. The purpose of the Tollgate Fuels Reduction Project is to address the needs identified above, by implementing actions that reduce the probability and potential extent of active crown fire within the Tollgate WUI. The project would reduce the amount and continuity of surface and canopy fuel loading, and in so doing, enhance and expand opportunities for protection of identified values at risk from wildfire damage or destruction.

## PROPOSED ACTIVITIES

In response to the purpose and need described above, the Walla Walla Ranger District proposes surface and canopy fuels reduction activities to improve protection to adjacent private lands and public/private infrastructure, change potential fire behavior within Tollgate WUI, and lower fire hazard to reduce the risk of potential adverse wildland fire effects on values at risk within the Tollgate planning area. Consistent with basic principles recommended by Agee and Skinner (2005), Tollgate Fuel reduction activities would reduce surface fuels, increase the height to live tree crowns, decrease crown density, and retain large trees of fire-resistant species. Thinning and removal of surface fuels can be a useful tool to achieve these objectives (Agee and Skinner 2005). Proposed thinning activities include the removal, mastication (grinding or mulching), and/or burning of both commercially valuable trees (trees with stem sizes greater than or equal to 9 inches in diameter at breast height) and smaller trees without commercial value. The removal and/or mastication of standing dead and dead/down material is also prescribed to help meet the objectives described above.

## Activity Locations of High Interest

Design objectives of proposed activities are to break-up fuel continuity on the landscape, so that when a wildfire does occur it could be contained to a smaller size and be of low intensity to allow for safe and effective fire suppression efforts. During the development of the proposed action the Interdisciplinary Team (IDT) identified several locations and/or proposed treatment types or areas of elevated interest and possible controversy, and highlighted them during public involvement. These highlighted areas are briefly discussed below:

### *Riparian Habitat Conservation Areas (RHCAs)*

In order to facilitate fuels reduction activities within strategically important (with respect to the project Purpose and Need) RHCAs occurring in the project planning area (units 19, 38, 66, and 75; Appendix A, Map A3), the Umatilla Forest Plan would be amended to allow commercial and non-commercial thinning activities and associated vegetation removal within Pacfish RHCA stream buffers. This site specific amendment would remain in effect until the completion of Tollgate Fuels Reduction project activities. Additional details regarding this amendment are located in Chapter 2.

The proposed activities would occur within Pacfish RHCA buffers, but would not occur directly adjacent to, or cross the wetted stream channel itself. Only those RHCAs identified above are proposed for treatment. All other RHCAs occurring within the project planning area would utilize a Pacfish RHCA buffer, within which no treatment activities would occur. RHCAs located within units 19, 38, 66, and 75 are proposed for fuels reduction activities. These RHCAs would be treated by mechanical means such as timber harvest. Logging systems would be designed so that no harvest or skidding would cross the stream channel. All applicable Forest Plan standards would be met.

### *Lookingglass Inventoried Roadless Area (IRA)*

The Lookingglass IRA is approximately 5,000 acres in size and is located south of Forest Road 6400 and east of State Highway 204. The Lookingglass IRA shares a common boundary with two privately owned forest inholdings both occurring along the IRAs northern face.

Fuels reduction activities are proposed within the Lookingglass IRA. The proposed activities include commercial thinning, ladder fuel reduction, removal of dead/down material. The activities are proposed on approximately 205 acres within the Lookingglass IRA boundary and are strategically located along property boundary with private inholdings to serve as strategic fuel breaks. Units 26, 38, and a portion of 75 occur within the IRA boundary (Appendix A, Map A3).

No proposed project activities would occur in the North Fork Umatilla Wilderness. No commercial timber harvest, road construction and reconstruction, or actions associated with these activities would occur in the Walla Walla River IRA.

### *Areas with trees 21 inches diameter-at-breast height or greater*

In order to best meet the project Purpose and Need it may be necessary to remove some trees 21 inches and greater. There are areas within the project planning area were large trees are closely clustered and have interlocking crowns. As a result to meet the objective to reduce horizontal continuity of fuels some trees equal to or greater than 21 inches DBH are proposed for removal. Vegetative analysis shows that the Tollgate planning area (46,000 acres) is within the Historic Range of Variability (HRV) for the moist forest plant biophysical environment and thus proposed removal of trees greater than or equal to 21 inches DBH or greater does not require a Forest Plan amendment. More discussion concerning HRV analysis can be found in Chapter 3.

The proposal identifies trees equal to or greater than 21 inches diameter at breast height (DBH) may be removed to meet fuel objectives across the planning area when operating within a moist forest type. The proposed removal would occur within units 45, 83, 84 and 95 (Appendix A, Map A3). Additionally, where necessary, for safety and/or logging corridors, incidental trees equal to or greater than 21 inches may be commercially removed.

### *Areas along Oregon State Highway 204*

Oregon State Highway 204 has been identified as an important evacuation route for the area. It is also an important commerce transportation route. The project proposes activities on both sides of Hwy. 204. These activities reduce surface fuels, increase the height to live tree crowns, decrease crown density, and retain large trees of fire-resistant species, and are thus designed to make Hwy. 204 a more defensible travel corridor, should a wildfire occur in the area. The following units are located along Hwy. 204 corridor: 18, 19, 20, 62, 64, 66, 68, 70, and 73 (Appendix A, Map A3). Highway 204 is a visually sensitive area. An analysis of visual effects of the proposed actions can be found in Chapter 3 of this DEIS.

## Timing of activities

Tollgate project activities are anticipated to begin in 2013. The anticipated time frame for completion of all components of the Tollgate project would be five (5) to ten (10) years, depending on market conditions and Forest Service staff and funding capacity. Activities would occur during the normal operating season as weather and soil conditions permit—typically between the months of May and November.

# AREAS OF CONTROVERSY AND ISSUES FOR ANALYSIS

There is no set of standard issues applicable to every proposal, so consideration is paid by the responsible official to a variety of laws, regulations, executive orders and input, with the help of the interdisciplinary team (IDT). The responsible official approved the issues to be analyzed in depth by the IDT in the environmental analysis. In the case of Tollgate, issues were grouped according to common resources.

- **Fuels reduction and wildfire behavior**: Proposed activities would likely alter potential fire behavior, improve capacity to protect values at risk, and improve opportunities for safe ingress/egress during fire events.
- **RHCA Activities:** Proposed tree cutting and related activities in RHCAs may impair water quality values and wildlife habitat.
- **Old forests:** Proposed tree cutting activities may reduce the quality, quantity, and/or connectivity of important habitat for wildlife, such as old forest, snags, and down woody debris.
- **Roadless Area Characteristics and potential Wilderness suitability**: Proposed tree-cutting activities may impair identified Roadless Characteristics, Wilderness Area Values, and the suitability of Potential Wilderness Areas for Wilderness designation.

- **Visual Resources:** Proposed tree cutting activities may impair the visual characteristics of the 6400 road and Highway 204 corridor.

Of these issue groups above, scoping comments suggested that the **RHCA Activities, Old forests, Roadless Area Characteristics and potential Wilderness suitability** issue groups constituted areas of possible controversy. The IDT identified and eliminated from detailed study the issues which are not significant or which have been covered by prior environmental review (1506.3), narrowing the discussion of these issues in the statement to a brief presentation of why they would not have a significant effect on the human environment or providing a reference to their coverage elsewhere. (40 CFR 1501.7(a)(3))

The ID team recommended, and the responsible official approved significant environmental issues deserving of detailed study. Significant issues used for analysis of environmental effects of each Alternative analyzed in detail are identified below in Table A. Issues were considered deserving of detailed study when they serve, for each Alternative, as a basis for determination of consistency with all applicable laws, rules, and regulations, as well as the relative ability to meet the project Purpose and Need. Additionally, some issues were used to evaluate the relative extent to which an Alternative meets in the Purpose and Need in a manner that minimizes or avoids adverse effects, and addresses unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the National Environmental Policy Act. Issues utilized in this manner are identified as such in Table A below.

**Table A —Issue groups and Issues for the Tollgate Fuels Reduction Project.**

| **Issue group** | **Issues for analysis**<br>*The proposed activities, in whole or in part, may:* |
|---|---|
| Old forest habitat | Reduce the amount of snags available for wildlife species and large down wood recruitment |
| | Alter the characteristics of old forest wildlife habitat |
| | Reduce the connectivity of old forest wildlife habitat |
| | Reduce the abundance of trees >21” DBH |
| | Affect the habitat and populations of MIS species |
| | Affect the habitat and populations of Sensitive wildlife species |
| | Affect the habitat and populations of the northern goshawk |
| | Affect the habitat and/or populations of other Priority birds / Landbirds / Neotropical migrants |
| Visual resources | Reduce scenic integrity of areas seen from Forest Road 6400, Road 6401, and Hwy. 204 |
| | Reduce scenic stability of areas seen from Forest Road 6400, Road 6401, and Hwy. 204 |
| Roadless Areas and potential Wilderness | Alter Roadless Area characteristics |
| | Eliminate suitability of areas Potential Wilderness |
| RHCA activities / hydrology | Impair water quality |
| | Alter hydrologic function and condition |
| | Affect water yield |
| Fuels reduction and potential fire behavior | Alter potential fire behavior (surface, active crown, passive crown, etc.) within the Tollgate WUI |
| | Alter fire travel times within the Tollgate WUI |
| | Reduce spotting distances within the Tollgate WUI |
| | Allow protection of adjacent and nearby private property in the Tollgate WUI |
| | Reduce potential surface fire intensity |
| | Enable safe ingress/egress when impacted by wildfire at or under 90% weather/fuel moisture conditions |

| | |
|---|---|
| Fisheries | Impair fish habitat |
| Soil | Increase the degree and extent of Detrimental Soil Condition |
| | Decrease the amount of effective ground cover |
| | Decrease the amount of coarse and fine woody debris |
| TES Plant species | Alter the distribution of TES plant species |
| Economic value | May affect timber values and associated economic activity |
| Recreation | May impact developed and dispersed camping |
| | May impact access to and/or opportunities for dispersed recreation activities |
| | My impact the Recreation Opportunity Spectrum |
| | My impact the “sense of place” in the Tollgate area |

## Proposed Forest Plan Amendment

Umatilla Forest Plan amendment #10, commonly referred to as Pacfish, is interim direction designed to “arrest the degradation and begin the restoration of aquatic habitat and riparian areas on lands administered by the Forest Service and BLM; it applies to watersheds outside the range of the northern spotted owl that provide habitat for Pacific salmon, steelhead, and sea-run cutthroat trout.”

Pacfish uses a buffer concept to establish riparian habitat conservation areas (RHCA) along both sides of streams, rivers, lakes and other wetlands. RHCA widths extend from the edge of the active stream channel and they vary with stream class and whether a stream is fish bearing or not. RHCAs can be established using specified feet of slope distance (such as 300 feet on either side of perennial, fish-bearing streams) or in numbers of “site-potential tree heights” (such as 2 site-potential tree heights for perennial, fish-bearing streams). The interim RHCA widths established by the Pacfish environmental assessment can be adjusted during watershed analysis or after site-specific analysis presenting a rationale for RHCA modifications.

Timber harvest activities are prohibited by the Pacfish amendment except in the following situations (see timber management standards, page C-9, in USDA Forest Service and USDI Bureau of Land Management 1994):

1. For catastrophic events such as fire, flooding, volcanic, wind or insect damage that result in degraded riparian conditions, and where present and future wood y debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and adverse effects on listed anadromous fish can be avoided, or
2. When applying silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on listed anadromous fish.

The activities included under Alternative B and occurring within Pacfish RHCAs are intended to reduce surface and canopy fuel loading, and not to acquire desired vegetation characteristics needed to attain Riparian Management Objectives. Furthermore, no catastrophic events or disturbance-caused damage has resulted in degraded riparian conditions. Therefore, the proposed activities in RHCAs do not fall under these situations and are thus not exempt from Pacfish prohibitions on commercial timber cutting within the RHCA.

In order to meet the project purpose and need, Alternative B would include a site and project-specific Forest Plan amendment which would allow for the proposed fuels activities within Pacfish Riparian Habitat Conservation Areas (RHCAs) of units 19, 38, 66, and 75. Specifically, the amendment would modify applicable Pacfish standards and guides regarding activities within RHCAs in the units identified above, to allow previously prohibited activities to occur. The amendment is site specific to the Tollgate Fuels Reduction project and would remain valid only during implementation of this project.

The Forest Plan amendment would have two parts (TM-1c and FM-1a) and allow the use of timber harvest for hazardous fuels reduction from Category 2 RHCAs which occur within units 19, 38, 66 and 75. This amendment would allow silvicultural practices to improve public and firefighter safety and allow the use of various fuel treatment practices to manage for desired fire behavior that would allow safe and effective suppression efforts. The amendment applies only to the Tollgate Fuels Reduction Project.

Currently, Pacfish timber management standards and guidelines include one item (TM-1): the prohibition of timber harvest within RHCAs. The two exceptions to this prohibition are described above and listed under TM-1 as TM-1a and TM-1b. The following proposed amendment (TM-1c) to Pacfish standards and guidelines would be added as an additional exception to the prohibitions described in TM-1, and would apply to the RHCAs within activity units 19, 38, 66, and 75. **TM-1c** would read as follows:

> Apply silvicultural practices for Riparian Habitat Conservation Areas(RHCAs) that occur on Category 2 streams (permanently flowing non-fish bearing streams) within units 19, 38, 66, and 75 of the Tollgate Fuels Reduction project, to acquire desired vegetation characteristics where needed to achieve project specific fuels reduction objectives. Apply silvicultural practices in a manner that avoids adverse effects on ESA-listed anadromous fish. This is a project and site-specific Forest Plan Amendment that applies only to the RHCAs within units discussed above, for the Tollgate Fuels Reduction project.

Pacfish also requires that fuels management strategies, practices, and actions do not prevent attainment of Riparian Management Objectives, and minimize disturbance of riparian ground cover and vegetation (Pacfish standards and guidelines, item FM-1). To the extent that this requirement prohibits mechanical removal of surface and canopy fuels within the RHCAs in units 19, 38, 66, and 75, a Forest Plan amendment is also needed to allow these activities to occur. Thus, in order to meet the project purpose and need as described in Chapter 1, the Tollgate project includes an amendment to the Pacfish standards and guidelines with respect to fuels management.

The amendment would both modify and supplement item FM-1. The first sentence of FM-1 would be modified to read: "Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation, except as described below in FM-1a." The supplement to FM-1 would be listed as **FM-1a**, and would read:

> Design fuel treatment and fire suppression strategies, practices, and actions within the riparian conservation areas (RHCAs) of Category 2 streams (permanently flowing non-fish bearing streams) found within units 19, 38, 66 and 75 of the Tollgate Fuels Reduction project so as to maintain channel stability and prevent adverse effects to riparian and aquatic habitat conditions.

## ISSUE RESOLUTION AND DECISION ALTERNATIVES

The issues identified above are analyzed in detail within this document, and resolved by disclosing:

- How each Alternative is consistent with applicable Laws, Rules, and Regulations
- The extent to which each Alternative meet the stated Purpose and Need
- Whether there any adverse effects requiring monitoring and/or mitigation, and show such effects may be mitigated through activity design criteria.
- The expected Direct, Indirect, and Cumulative Effects of the activities included in Action Alternatives B and C on the quality of the human environment.

- The extent to which each Alternative addresses unresolved conflicts concerning the alternative use of available resources.

Alternatives for this project were designed to address areas of unresolved conflict over alternative uses of existing resources in a manner that meets the project purpose and need. The ID team developed the range of alternatives, project design features, and mitigation measures presented in this chapter based on scoping responses and the purpose and need for action described in Chapter 1 of this document. In total, ten alternatives were considered, seven were eliminated from detailed study and three were analyzed in detail. The IDT recommended and the responsible official approved two action alternatives in addition to a no action alternative.

Under the HFRA, for an authorized hazardous fuel reduction project that is proposed to be conducted in the wildland-urban interface (such as the Tollgate project), the Forest Service is not required to study, develop, or describe more than the proposed agency action and 1 action alternative in the environmental impact statement prepared pursuant to section 102(2) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)) Nevertheless, in an effort to address any potential unresolved conflicts over alternative uses of available resources, the IDT considered one additional action alternative that was based on comments proposed during scoping and meets the purpose and need of the project.

## MAJOR CONCLUSIONS

- **Both Action Alternatives B and C were are each found to be consistent with all applicable Laws, Rules, and Regulations**, as described in Chapters 1 and 4.
- Analysis of the extent to which Alternatives A, B, and C would meet the Purpose and Need of the Tollgate Fuels Reduction Project Purpose includes the extent to which each Alternative 1) reduced the extent of areas within the WUI of active crown fire potential, 2) reduced potential wildfire travel time, 3) reduced potential wildfire intensity, and 4) reduced potential wildfire spotting distance. **Defined as such, Alternative A was found to be the most deficient in meeting the Purpose and Need. Alternative B (the Proposed Action and Preferred Alternative) was found to be most suitable for meeting the Purposed and Need, and Alternative C slightly less so**.
- Potential adverse effects to the quality of the human environment were identified as a possible consequence of surface and canopy fuel reduction and associated activities included in Action Alternatives B or C. These include possible adverse effects to water quality and quantity, fish habitat, air quality, soil productivity, exotic plant invasion, cultural heritage sites, wildlife habitat, recreation quality and access, residual trees, and sensitive plant species. **Mitigation measures were identified to be implemented along with the activities described as part of Alternatives B and/or C,** and area described in Chapter 2. The **expected effectiveness** of these measures in mitigating possible adverse effects was included within the analysis contained in Chapter 4 and summarized below.
- The expected Direct, Indirect, and Cumulative Effects of the activities included in Action Alternatives B and C on the quality of the human environment are summarized as follows:
    - All alternatives would be consistent with Forest Plan Standards and Guidelines for achieving soil quality maintenance objectives, including detrimental soil condition and effective ground cover.
    - Effects of proposed actions would not adversely or measurably affect water temperature. Short term measurable turbidity effects could occur at the culvert sites during replacement of 2 culverts.
    - The proposed project is in compliance with the Clean Water Act, and meets or exceeds all Forest Plan Standards and Guidelines for Direct, Indirect, or Cumulative Effects to vegetation, wildlife, cultural, recreation, and Wilderness resources.

- Depending on the organism species and location, the activities would have no effect or may affect, but are not likely to adversely affect all applicable and/or affected Threatened, Endangered, Protected, and Sensitive wildlife and fish species.
- Within the Tollgate fuels project boundary, the primary difference in effects to invasive plant species from the three project alternatives is shown by the differing numbers of acres that are placed at high risk of noxious weed spread. Alternative B creates the most acreage at high vulnerability for weed infestation, due to the slightly larger amount of ground disturbing activities proposed. The smaller area of ground disturbance in Alternative C results in slightly fewer acres at high risk. There is potential for a increase in noxious weed infestation within the planning area due to existing conditions and the types of activities analyzed.
- Proposed harvest activities would create short term effects which could potentially alter the recreation setting. However, the proposed activities do not alter the setting enough to measurably affect the recreation experience.
- Alternative B was found to be economically viable, but has a lower present net value (PNV) than alternative C because it has slightly higher logging costs.
- It is expected that all of the activities proposed in all of the action Alternatives would meet the visual quality objectives of the Forest Plan. The impacts would not exceed the limits of visual impacts defined by modification and partial retention. Characteristics of scenic integrity and stability are expected to be maintained or enhanced.
- No project activities are proposed in the North Fork Umatilla Wilderness and, therefore, would have no direct and indirect effects on wilderness qualities of untrammeled, natural, and undeveloped character. There would be no effects to solitude from timber harvest, mechanical fuel activities or road construction because those actions are not proposed for this area. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the Wilderness would reduce a sense of solitude and remoteness in the short-term, during project activity. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the boundary of the wilderness would continue to have short-term effects on opportunities of solitude and remoteness. In the long-term there would be no change to the availability of solitude or primitive recreation.
- For Potential Wilderness Areas (PWAs) directly overlapping with activities proposed under Alternatives B and/or C, scenic quality and natural appearance would be reduced. These acres would no longer meet PWA inventory criteria found in Forest Service handbook, due to the presence of stumps, skid trails, slash, changes in stand density and appearance of individual trees that were limbed. For PWAs adjacent to or near activities proposed under Alternatives B and/or C, The smells, sounds and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the PWAs would reduce a sense of solitude and remoteness in the short-term, during project activity. Activities adjacent to PWAs would not preclude the PWAs from being retained in the PWA inventory.
- In alternatives B and C there would be no direct effects to the Walla Walla River Inventoried Roadless Area (IRA) because no activities are proposed within the boundaries of the IRA. The IRA would retain its current degree of natural integrity. There would be no management changes or improvements to the ecological function within the IRA. Biological and ecosystem functions would likely continue as they are in the present condition Potential indirect effects may occur from project activities outside the Walla Walla IRA. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the IRA would reduce a sense of solitude and remoteness in the short-term, during project activity. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the

boundary of the wilderness would continue to have short-term effects on opportunities of solitude and remoteness. In the long-term there would be no change to the availability of solitude or primitive recreation.

- Within the portions of the Lookingglass IRA, the 4% of the IRA that would be directly affected by the proposed activities are confined to its outer edges, on flatter areas above the topographic break, generally adjacent to roads, private land and areas with evidence of past human activity. The vast core of the IRA (96%) below the canyon rims would remain undisturbed and retain the existing degree of Roadless characteristics. Within portion of the Lookingglass IRA directly overlapping activities planned under Alternative B, the natural appearance of the landscape would be reduced following treatment activities. Stumps, skid trails and slash would be evident where commercial thinning and ladder fuel reduction occurs. Tree density would be reduced which would result in more open stands compared with neighboring untreated areas. The stands would not likely be opened to the point that the skyline of the forest canopy appears highly manipulated to the casual observer. In strategic areas, typically nearer roads, trees would be limbed to about six feet to reduce fuel ladders. These trees would no longer appear natural. Overall, scenic quality and natural appearance would be reduced.
- Proposed fuel activities in Other Undeveloped Lands would create stumps which would reduce the size of polygons mapped as Other Undeveloped Lands. The lands would appear relatively managed and developed. The sights, sounds, and changes in vegetation from activities and use would further decrease the natural integrity and sense of naturalness within treatment units and along roads. All treated units would remain forested after harvest although skid trails, stumps, and landings could be evident. Stand structure would change, therefore, diversity of plant and animal communities may shift from current patterns but ecological diversity would remain (Chapter 3, Vegetation section). Impacts to natural integrity and sense of naturalness would likely be evident until stumps and vegetation canopies are no longer substantially recognizable (about 75 to 100 years). The sounds of machinery from active units would reduce a sense of naturalness and solitude during project operations but would not persist in the long term. Other impacts, such as tree marking paint and logging slash would be visible in the short term (about 5 to 10 years). Impacts such as skid trails and tree stumps would be evident for a longer period. The increased numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation.

- Alternative C was developed and analyzed to address (or partially address) unresolved conflicts concerning the potential alternative uses of available resources. This includes the uses of Riparian Habitat Conservation Areas for stream shade and channel stability, as well as the uses of areas with proposed activities included within the Lookingglass IRA for Roadless Characteristics. Finally, Alternative C was also developed and analyzed to address unresolved conflicts over the potential alternative uses of trees >21” in stem diameter at breast height (DBH) as habitat for wildlife species. Because Alternative C precludes activities occurring within the Lookingglass IRA and the cutting of trees >21” DBH, it fully addresses these conflicts over the alternative uses of these available resources; however, because this Alternative still includes fuels reduction activities within one RHCA (within unit 19), it partially, but does not fully address conflicts over alternative uses of RHCA resources.

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- Appendix G – Responses to comments (blank for DEIS)
- Appendix H – Potential Wilderness Inventory

# CHAPTER 1 – PURPOSE AND NEED

# INTRODUCTION

The Forest Service has prepared this draft Environmental Impact Statement (DEIS) for the Tollgate Fuels Reduction project. Planning and analysis of the Tollgate Fuels Reduction Project are being conducted under authorizations of the Healthy Forest Restoration Act (HFRA). The Tollgate Fuels Reduction Project occurs within the Upper 204/Tollgate Wildland Urban Interface (WUI) identified in the Umatilla County Community Wildfire Protection Plan (CWPP) as amended. The Tollgate project began with the initial objective to reduce fuels and provide protection to private property and vital infrastructure that occurs within the area. The Forest Service—in close partnership and consultation with interested citizens, local government officials, and state agencies—worked in a collaborative manner to refine project objectives and begin formulating the types of activities which would be used to achieve those objectives.

These collaborative efforts resulted in the development of the proposed action which was submitted for public review and initiated public scoping in October 2010 by the publication of a Notice of Intent in the Federal Register. Several responses were received from public scoping which were used in the development of the refinement of the proposed action and the development of action alternative(s). Additional analysis and scoping efforts revealed a need to amend the Umatilla National Forest Land and Resource Management Plan (LRMP, also known as Forest Plan) to allow treatment activities to occur within selected Pacfish  Riparian Habitat Conservation Areas (RHCAs) in a manner that may not be consistent with the Riparian Management Objectives originally defined in Pacfish . On September 6, 2011, a second Notice of Intent appeared in the Federal Register that reintroduced the Tollgate Fuels Reduction Project and included identification that an amendment to the Forest Plan would be prepared in conjunction with this action. Additionally, public input on the revised Tollgate proposal was solicited by a second round of mailings to interested parties.

## Healthy Forest Restoration Act of 2003

In 2003, the Health Forest Restoration Act (HFRA) was enacted by Congress and President George W. Bush. The legislation provides unique tools and authorities to "reduce risks of damage to communities, municipal water supplies and other at-risk Federal land through a collaborative process of planning, prioritizing, and implementing hazardous fuels reduction projects…. "(HR 1904- section 2- 'Purposes' page 2)

The HFRA encourages communities to designate their Wildland Urban Interfaces (WUIs) through the development of Community Wildfire Protection Plans (CWPPs). The CWPPs were developed with public input and with technical guidance from public land managers (both state and federal).

The HFRA sets forth special procedures when agencies prepare environmental analysis for authorized hazardous fuels reduction projects. These authorizations include streamlined processes for the development of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) and for the administrative and judicial review of such projects.

## Umatilla County Community Wildfire Protection Plans

Umatilla County completed its Community Wildfire Protection Plan (CWPP) in June 2005. The CWPP identified thirteen (13) Wildland-Urban Interfaces (WUIs). The Upper 204/Tollgate WUI (Tollgate WUI) is identified in this CWPP. In 2008, Umatilla County in collaboration with the Oregon Department of Forestry expanded the Tollgate WUI to include a private inholding (T4N., R38E., Section 36). The WUI boundary was adjusted to provide protection to the residence of this private inholding. All of the proposed activities for the Tollgate Fuels Reduction Project would occur on National Forest System lands within the Tollgate WUI.

## Umatilla National Forest Land and Resource Management Plan

The Umatilla NF Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Umatilla National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. The Umatilla National Forest Plan was prepared and is maintained at the Umatilla National Forest Headquarters in Pendleton, Oregon.

This project responds to the following Forest Plan goals (FP pages 4-1 to 4-3):

- To provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources, uses, and values which meet local, regional, and national social and economic needs.
- Provide for production and sustained yield of wood fiber and insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency.
- To provide and execute a fire protection and fire use program that is cost-efficient and responsive to land and resource management goals and objectives.

Promote human resources, civil rights, and community development within the zone of influence of the Forest. Promote cooperation and coordination with individuals, groups, landowners, Forest users, Native American tribes, and state and Federal agencies in forest management, and community and economic development.

# LOCATION AND AREA

The Tollgate project planning area is approximately 46,000 acres in size and is located on Walla Walla Ranger District mainly in Umatilla County, Oregon with a small portion in Union County, Oregon (Appendix A, Map A1). It is located within portions of T. 2 N. R. 38 E section 5; T. 3 N. R. 37 E. sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, and 26; T. 3 N. R. 38 E. sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 32, 33, 34, and 35; T. 3 N. R. 39 E. sections 6 and 7; T. 4 N. R. 37 E. sections 34, 35, and 36; T. 4 N. R. 38 E. sections 1, 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36. T. 4 N. R. 39 E. sections 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 29, 30, 31, and 32. The project occurs within the Upper Umatilla, Upper Walla Walla River, and Lookingglass Creek watersheds.

The Tollgate project planning area is bounded by private property to the northwest, the Walla Walla River drainage to the northeast, Lookingglass drainage to the southeast, North Fork Umatilla Wilderness to the southwest and is bi-sected by Oregon Highway 204 (Appendix A, Maps A1 and A2). Elevations above sea level range from 2400 to 5200 feet. The area is one of the most utilized recreational areas on the Umatilla National Forest. The area provides access to numerous campgrounds (including Jubilee Lake), the Spout Springs Summer Homes, and the Spout Springs Ski Area. The town of Elgin, Oregon is approximately 10 miles to the southeast. Portions of the Lookingglass inventoried Roadless area (IRA), Walla Walla River IRA and North Fork Umatilla Wilderness occur within the Tollgate project planning area.

# PURPOSE AND NEED FOR ACTION

The Tollgate community is situated on a high plateau between the North Fork Umatilla Wilderness and South Fork of the Walla Walla River. The Tollgate plateau is surrounded on all sides by very steep, and deep, inaccessible canyons (Appendix A, MapA2, and Figure 1-1). The plateau is generally characterized by mixed to high-severity fire regimes. Private lands and inholdings are adjacent to, and interspersed with, National Forest System (NFS) lands.

In many cases on other NFS lands, Wilderness and Roadless areas occur at higher elevations and are well removed from communities. In contrast, the Tollgate plateau sits above large tracts of both Roadless and Wilderness areas. Potential fire behavior analysis—and recent wildfire behavior—indicates that wildfires will likely initiate in these remote places, gain uncontrollable intensity, and ultimately emerge onto the plateau with firebrand spotting distances of up to 1 or 2 miles into the Tollgate WUI (Figure 1-1). During most fire seasons, the geographic positioning of the Tollgate WUI relative to large tracts of remote and inaccessible Roadless and Wilderness areas places it at considerable risk of high-severity, high-intensity wildfires moving into and through the area (Figure 1-1). These wildfire risks threaten many important values identified in the Umatilla County CWPP:

1. *Residences*- There are approximately 370 residences within the Upper 204/Tollgate WUI. There are 43 privately owned cabins under Forest Service special use permit and the Spout Springs Ski Resort is also within the project planning area (Appendix A, MapA2).
2. *Local and Regional Infrastructure*: There is infrastructure that occurs throughout the area that holds both local and regional importance to various surrounding communities. There are fiber optic lines, telephone lines, power transmission lines, power distribution lines, communications equipment and scientific sampling devices (Appendix A, MapA2). The Tollgate community is bisected by Oregon State Highway 204. This highway serves as a major transportation route for shipping commercial goods and people. The highway connects the communities of Elgin, OR in the south to Milton-Freewater, OR and in the north, Pendleton, OR (Appendix A, Map A1).
3. *Forest Service infrastructure*: There are 4 Forest Service campgrounds, 6 trailheads, 4 snowparks and other Forest Service facilities (such as the Tollgate Work Center and Tollgate Visitor Center).
4. *Public Health and Safety:* Given the high amount of recreational use seen by the area, a wildland fire event would likely cause serious threat to human life (both residents and wildland fire responders) as well as property. In such an event, fire managers expect that a large number of resources (personnel and financial) would be expended in fire suppression operations in the area. Given the areas current vegetative conditions this would constitute increased risk due to the amount of personnel hours spent on suppression activities.

Consistent with the Umatilla County CWPP and Umatilla Forest Plan, the **desired condition** for the Tollgate planning area is a WUI area generally characterized by fuel profiles with a low likelihood of active crown fire, and which are thereby suitable for:

- Direct wildfire control and suppression under all but the most extreme circumstances in accessible areas widely distributed within the Tollgate WUI
- Safe ingress and egress within the Tollgate WUI during wildfire events
- Protection (by firefighters and firefighting resources) of identified Values at Risk from wildfire-caused injury, loss of life, property damage, or destruction

**Existing levels of hazardous fuels in the Tollgate WUI are not consistent with these desired conditions**. Throughout most areas in the Tollgate vicinity, fuel loading, arrangement, and continuity are not suitable for direct wildfire attack and suppression under typical fire weather and fuel moisture conditions. Safe ingress and egress would not be possible during wildfire events where crown fire is likely to occur—which is presently along most travel routes within the Tollgate WUI. Finally, crown fire is expected in many areas (including most areas surrounding private property and other infrastructure) throughout the majority of the normal fire season.

The **need** for action in the Tollgate area is based upon difference between existing and desired conditions with respect to fuel levels, associated potential wildfire behavior, and related risks to the values identified above. The **purpose** of the Tollgate Fuels Reduction Project is to address the needs identified above, by implementing actions that reduce the probability and potential extent of active crown fire within the Tollgate WUI. The project would reduce the amount and continuity of surface and canopy fuel loading, and in so doing, enhance and expand opportunities for protection of identified values at risk from wildfire damage or destruction.

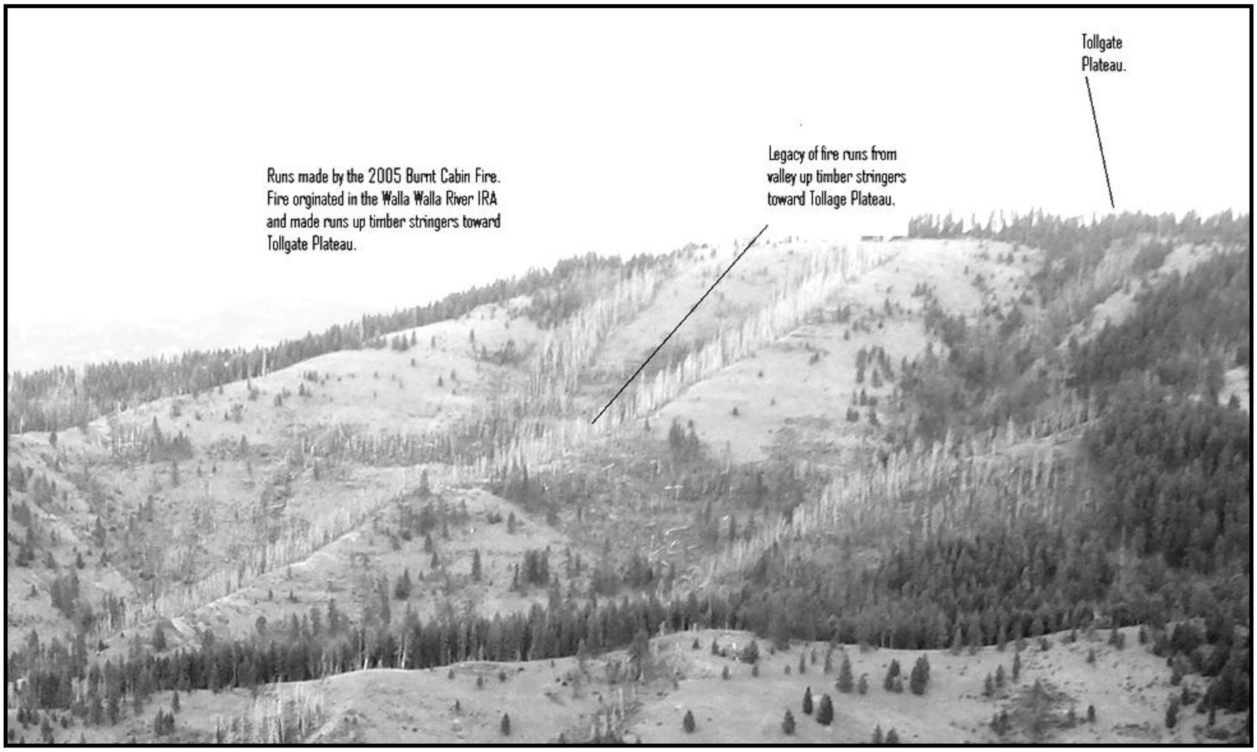


**Figure 1-1 -- Photograph of 2005 Burnt Cabin Fire effects taken from location near Target Meadows Campground**

## PROPOSED ACTIVITIES

In response to the purpose and need described above, the Walla Walla Ranger District proposes surface and canopy fuels reduction activities to improve protection to adjacent private lands and public/private infrastructure, change potential fire behavior within Tollgate WUI, and lower fire hazard to reduce the risk of potential adverse wildland fire effects on values at risk within the Tollgate planning area. Consistent with basic hazardous fuels reduction principles recommended by Agee and Skinner (2005), Tollgate Fuel reduction activities would reduce surface fuels, increase the height to live tree crowns, decrease crown density, and retain large trees of fire-resistant species. Thinning and removal of surface fuels can be a useful tool to achieve these objectives (Agee and Skinner 2005). Proposed thinning activities include the removal, mastication (grinding or mulching), and/or burning of commercially valuable trees (trees with stem sizes greater than or equal to 9 inches in diameter at breast height), as well as smaller trees without commercial value. The removal and/or mastication of standing dead and dead/down material is also prescribed to help meet the objectives described above.

Following are brief descriptions of activities proposed for implementation, along with associated activities that would occur concurrently. More detailed descriptions of proposed actions can be found in Chapter 2 of this document.

## Surface and Canopy Fuels Reduction

Reduction of forest canopy bulk density (while retaining a fully stocked stand) by removing specified crowns, where canopy bulk density is the weight of the available canopy fuel. By reducing the total available fuel in the crowns and providing space between the crowns, this treatment reduces stand potential to produce or sustain crown fire.

The post-treatment residual overstory density would vary depending upon the species composition and individual tree characteristics of the site, but would always exceed 80 $ft^2$/ac of basal area. In general, residual tree density would be increase along with site productivity. In other words, the forest thinning activities are not intended to regenerate new trees, although this is expected to occur in the more productive sites. Activities would tend to favor early seral tree species such as ponderosa pine and western larch, and favor larger, more fire-resistant tree for retention. Fuels reduction activities include **Commercial thinning (CT), Non-Commercial Thinning (NCT), Ladder Fuel Reduction (LFR), and Dead and Down Woody Debris Removal (DDR).** These activities are described in detail in Chapter 2 and Appendix A, Maps A3 and A4.

## Activities Supporting Fuels Reduction and Public Safety

### *Road Management*

In order to accomplish proposed activities, approximately 30 miles of open system roads and about 16 miles of closed[1] system roads would be used. Approximately 5 miles of Oregon State Highway 204 exist within the project planning area. Closed system roads used for project activities would not be opened to the public and would be closed following project activities. All system roads would remain the same after project implementation; open roads would remain opened, closed roads would continue to be closed, and seasonally open roads would continue with that designation.

Approximately 2.6 miles of temporary road construction would occur and would be decommissioned after project activity use. Normal routine road maintenance activities (such as road blading, roadside brushing, ditch clearing, etc.) would occur. Non-functional culverts would be cleaned and/or replaced, and water source ponds would be cleaned as needed.

Approximately 0.35 miles of forest road 3718155 is inside an RHCA and would be moved to an upland site which occurs outside of the RHCA. The road is inside the RHCA of a perennial non-fish bearing stream and has a native surface (soil). The road is adjacent to a spring and the roadbed is saturated for

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[1] **Closed Road:** These roads are not available for motorized vehicle travel for everyday access and are gated or closed by barricades. These roads can be opened for access for resource management activities or fire suppression. Snowmobile use is allowed except where specifically prohibited.

much of the year in that location. The existing segment of road would be decommissioned and rehabilitated. Forest Road 3718155 is listed as a closed road by the Walla Walla RD Access and Travel Management Plan. This realignment activity would not change its Access and Travel Management status. Following the completion of fuels reduction activities, Forest Road 3718155 would be gated and would retain its current status as a closed road.

### *Danger Tree Removal*

"Danger trees" (trees which are, within the next 0-10 years, likely to fall in an uncontrolled manner in proximity to unprotected persons and property, and/or limit effective ingress/egress, and thereby pose a substantial risk to human life or property) would be felled and removed along all haul routes used for timber sale activity, as well as both open and closed system roads. If considered economically feasible, these trees would be sold as part of a timber sale.

## Activity Locations of High Interest

Design objectives of proposed activities are to break-up fuel continuity on the landscape, so that when a wildfire does occur it could be contained to a smaller size and be of low intensity to allow for safe and effective fire suppression efforts. During the development of the proposed action the Interdisciplinary Team (IDT) identified several locations and/or proposed treatment types or areas of high interest and highlighted them during public involvement. These highlighted areas are briefly discussed below:

### *Riparian Habitat Conservation Areas*

During project development the IDT identified several areas that held strategic importance for protection of values at risk and providing for firefighter/public safety during a wildfire event. These strategic points were identified based on potential fire travel path modeling which identified several likely areas where active crown fires would emerge up from the Lookingglass and South Fork Walla Walla Roadless Areas, and North Fork Umatilla Wilderness (Figure 1-1) via corridors of high-density forests—some of which are also Pacfish Riparian Habitat Conservation Areas (RHCAs, USDA Forest Service 1995) (Figure 1-2). Areas of strategic importance for fire protection in the Tollgate WUI often coincide with RHCAs because the topography and fuel profiles associated with stream drainages (emerging from these Wilderness and Roadless areas) are in many cases conducive to active crown fire spread into the Tollgate WUI.

As a result, the IDT proposed fuels reduction treatment within four Pacfish Riparian Habitat Conservation Areas (RHCAs) of particular strategic importance, given their location, potential fire behavior, and proximity to values at risk (described above). Protection of residential or other structures during a normal wildfire event would only be possible after surface and canopy fuel reduction within the RHCA.

The proposed activities would occur within the Pacfish RHCA buffer, but would not occur directly adjacent to, or cross the wetted stream channel itself. Only those RHCAs identified above are proposed for treatment. All other RHCAs occurring within the project planning area would utilize a Pacfish RHCA buffer, within which no treatment activities would occur. RHCAs located within units 19, 38, 66, and 75 are proposed for fuels reduction activities. These RHCAs would be treated by mechanical means such as timber harvest. Logging systems would be designed so that no harvest or skidding would cross the stream channel. All applicable Forest Plan standards would be met.

**Figure 1-2 – Hazardous fuels adjacent to recreation residences within Unit 19.**

In order to facilitate fuels reduction activities within strategically important (with respect to the project Purpose and Need) RHCAs occurring in the project planning area (units 19, 38, 66, and 75; Appendix A, Map A3, Figure 1-2), the Umatilla Forest Plan would be amended to allow commercial and non-commercial thinning activities and associated vegetation removal within Pacfish RHCA stream buffers. This site specific amendment would remain in effect until the completion of Tollgate Fuels Reduction project activities. Additional details regarding this amendment are located in Chapter 2.

### *Lookingglass Inventoried Roadless Area*

The Lookingglass Inventoried Roadless Area (IRA) is approximately 5,000 acres in size and is located south of Forest Road 6400 and east of State Highway 204. The Lookingglass IRA shares a common boundary with two privately owned forest inholdings both occurring along the IRAs northern face. Much of the forest area within the IRA and adjacent to the private land are characterized by dense forest and high loads of surface and canopy fuels (Figure 1-3).

Fuels reduction activities are proposed within the Lookingglass IRA. The proposed activities include commercial thinning, ladder fuel reduction, removal of dead/down material. The activities are proposed on approximately 205 acres within the Lookingglass IRA boundary and are strategically located along property boundary with private inholdings to serve as strategic fuel breaks. Units 26, 38, and a portion of 75 occur within the IRA boundary (Appendix A, Map A3).

No proposed project activities would occur in the North Fork Umatilla Wilderness. No commercial timber harvest, road construction and reconstruction, or actions associated with these activities would occur in the Walla Walla River IRA.

**Figure 1-3 -- Representative vegetation density, structure, and fuel loading within Lookingglass IRA, taken from Forest Road 6400**

### *Areas with trees 21 inches diameter-at-breast height (DBH) or greater*

In order to best meet the project Purpose and Need it may be necessary to remove some trees 21 inches and greater. There are areas within the project planning area were large trees are closely clustered and have interlocking crowns. As a result to meet the objective to reduce horizontal continuity of fuels some trees equal to or greater than 21 inches DBH are proposed for removal. Vegetative analysis shows that the Tollgate planning area (46,000 acres) is within the Historic Range of Variability (HRV) for the moist forest plant biophysical environment and thus proposed removal of trees greater than or equal to 21 inches DBH or greater does not require a Forest Plan amendment. More discussion concerning HRV analysis can be found in Chapter 3.

The proposal identifies trees equal to or greater than 21 inches diameter at breast height (DBH) may be removed to meet fuel objectives across the planning area when operating within a moist forest type. The proposed removal would occur within units 45, 83, 84 and 95 (Appendix A, Map A3). Additionally, where necessary, for safety and/or logging corridors, incidental trees equal to or greater than 21 inches may be commercially removed.

### *Areas along Oregon State Highway 204*

Oregon State Highway 204 has been identified as an important evacuation route for the area. It is also an important commerce transportation route. The project proposes activities on both sides of Hwy. 204. These activities reduce surface fuels, increase the height to live tree crowns, decrease crown density, and retain large trees of fire-resistant species, and are thus designed to make Hwy. 204 a more defensible travel corridor, should a wildfire occur in the area. The following units are located along Hwy. 204 corridor: 18, 19, 20, 62, 64, 66, 68, 70, and 73 (Appendix A, Map A3). Highway 204 is a visually sensitive area. An analysis of visual effects of the proposed actions can be found in Chapter 3 of this DEIS.

## Timing of activities

Tollgate project activities are anticipated to begin in 2013. The anticipated time frame for completion of all components of the Tollgate project would be five (5) to ten (10) years, depending on market conditions and Forest Service staff and funding capacity. Activities would occur during the normal operating season as weather and soil conditions permit—typically between the months of May and November.

# TIERING AND INCORPORATION BY REFERENCE

In order to reduce repetition and focus on site-specific analysis, this DEIS is tiered to the following documents as permitted by 40 CFR 1502.20:

- The FEIS for the ***Umatilla National Forest Land and Resource Management Plan*** and Record of Decision (ROD) dated June 11, 1990 and all subsequent NEPA analysis for amendments. The Umatilla National Forest Land and Resource Management Plan FEIS analyzed the environmental effects of different options of management for the Umatilla National Forest. The FEIS analyzed eight (8) alternatives in detail. Ultimately, Alternative F/M was selected for implementation. This selected alternative is the foundation of the Umatilla National Forest Land and Resource Management Plan (LRMP), also known as the "Forest Plan."
- Umatilla National Forest Invasive Plants Treatment Final Environmental Impact Statement (FEIS), decision dated July 2010. Authorizes treatment of invasive plant species over a 5-15 year period using manual, mechanical, biological, herbicide, and cultural activities.

This DEIS also incorporates by reference the following documents:

- ***Umatilla National Forest Land and Resource Management Plan (LRMP)*** **as amended (Forest Plan).** The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Umatilla National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.
- The **Biological Opinion for the** ***Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (***Pacfish ) from National Marine Fisheries Service dated January 23, 1995. Pacfish itself does not propose any ground-disturbing actions, but sets in place certain riparian management goals and management direction with the intent of arresting the degradation and beginning the restoration of riparian and stream habitats.

- The **Biological Opinion on the** ***Land and Resource Management Plans for the Boise, Challis, Nez Perce, Payette, Sawtooth, Umatilla and Wallowa-Whitman National Forests*** from National Marine Fisheries Service, dated March 1, 1995. National Marine Fisheries has identified a set of goals, objectives, and guidelines that apply to watershed and site-specific consultations until Land and Resource Management Plans are amended. Conformance with the provisions of this Opinion, in combination with implementation of PACFISH , should provide reasonable certainty that site-specific actions would not result in jeopardy to listed salmon or adverse modification of critical habitat.

- The **Biological Opinion for the** ***Effects to Bull Trout from Continued Implementation of Land and Resource Management Plans and Resource Management Plans as Amended by the Interim Strategy for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho,***

***Western Montana, and Portions of Nevada (INFISH), and the Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH )*** from National Marine Fisheries Service, dated August 14, 1998. This BO addresses the effects of continued implementation of LRMPs as amended by PACFISH standards and guidelines where listed distinct population segments of bull trout occur in Idaho, Montana, Oregon, and Washington.

- The **Biological Opinion -** ***Land and Resource Management Plans for National Forests and Bureau of Land and Management Resource Areas in the Upper Columbia River Basin and Snake River Basin Evolutionarily Significant Units*** by National Marine Fisheries Service dated June 22, 1998. This BO addresses the effects of continued implementation of the 18 LRMPs as amended by PACFISH standards and guidelines on Snake River salmon and steelhead.

- USDA Forest Service, Region 6, 2000, "***Memorandum of Agreement*** between the USDA Forest Service Region 6 and the State of Oregon Water Resources Department for Meeting Responsibilities under Federal and State Water Quality Laws."

- Annual ***Forest Plan Monitoring and Evaluation Reports*** from 1991 to 2004. The main focus of the Umatilla's monitoring strategy is to ensure consistency in implementing the Forest Plan.

- ***Walla Walla Ranger District Motorized Access and Travel Management Plan Environmental Assessment (EA),*** Walla Walla Ranger District, July 1993. A comprehensive program resulting in a transportation system which provides for a broad mix of both motorized and non-motorized recreation opportunities while moving toward Forest Plan desired future conditions.

- ***Analysis of Umatilla National Forest Road System,*** dated March, 2004. Forest-scale analysis in determining the minimum road system needed to meet resource and other management objectives.

- The ***Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*** released 1996. Links landscape, aquatic, terrestrial, social, and economic characterizations to described biophysical and social systems.

- ***Updated Blue Mountain Project Design Criteria (PDC) – Programmatic Informal Section 7 Consultation (13420-2007-I-0154).*** Letter of concurrence dated June 4, 2007 from U.S. Dept. of the Interior, Fish and Wildlife Service for informal consultation and accompanying updated Blue Mountain Province Expedited Process Instrument for Programmatic Informal Section 7 Consultation (April 25, 2007).

- ***Implementing Streamlined Consultation Procedures for Section 7 of the Endangered Species Act – ICS Memo #2 May 27, 2003.*** Memo on streamlined consultation procedures by an Interagency Coordination Subgroup (ICS).

- ***Umatilla National Forest Interim Snag Guidance Letter*** dated April, 1993, which provides direction on the number and distribution of snags to retain in harvest units.

- ***National Fire Plan*** (August 2000) developed with the intent of responding to severe wildland fires and their impacts to communities while addressing five key points: Firefighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance, and Accountability.

- ***Region 6 Protocol for Assessment and Management of Soil Quality Conditions*** dated January 2002.

Established consistency in soil assessment methods on the Umatilla National Forest and other Blue Mountain forests, and ensures compliance with Forest Plan and NEPA condition assessment needs.

# MANAGEMENT DIRECTION

## Umatilla National Forest Land and Resource Management Plan

As previously noted, the Forest Plan (USDA Forest Service 1990) provides most of the management direction for Tollgate Fuels Reduction Project. The Forest Plan made land allocations using management areas (MA), each of which emphasizes a particular desired future condition (DFC). Forest Plan standards and guidelines provide direction for achieving DFCs.

Additional management direction is provided by Forest Plan amendments approved since 1990, including three amendments in particular:

- "Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales" (USDA Forest Service 1995; also known as Eastside Screens); and
- "Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho and Portions of California" (USDA Forest Service and USDI Bureau of Land Management 1994; also known as Pacfish ).
- The Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Umatilla National Forest Plan.

The Eastside Screens (FP amendment #11; approved 6/12/1995) focuses on potential impacts of timber sales on riparian habitat, historical vegetation patterns, and wildlife fragmentation and connectivity (USDA Forest Service 1995).

Pacfish (FP amendment #10; approved 2/24/1995) establishes management direction designed to arrest and reverse declines in anadromous fish habitat (USDA Forest Service and USDI Bureau of Land Management 1994).

The R6 2005 FEIS (approved 10/11/2005) amended the Forest Plan by adding management direction relative to invasive plants.

The Forest Plan allocates management areas as the way to characterize the landscape for the type and intensity of management activities that may occur on Umatilla National Forest. Management areas within the project planning area are shown in Table 1-1.

**Table 1-1 — Forest Plan Management Areas within the Tollgate project planning area**

| Forest Plan Management Areas | Management Area Acres within Planning Area | Acres proposed for treatment by Management Area | Percentage of affected Management Areas proposed for treatment |
|---|---|---|---|
| A2- Dispersed Recreation | 3, 104 | 83 | 3% |
| A3- Viewshed 1 | 6,419 | 1,306 | 20% |
| A4- Viewshed 2 | 257 | 22 | 9% |
| A5- Roaded Natural | 561 | 0 | 0% |
| A6- Developed Recreation | 1,487 | 132 | 9% |

| | | | |
|---|---|---|---|
| A9- Special Interest Area | 228 | 38 | 17% |
| B1- Wilderness | 12,571 | 0 | 0% |
| C1- Dedicated Old Growth | 1,845 | 0 | 0% |
| C4- Wildlife Habitat | 2,441 | 0 | 0% |
| C5- Riparian and Wildlife Habitat | 272 | 11 | 4% |
| E2- Timber and Big Game | 10,722 | 2,819 | 26% |
| F4- Walla Walla River | 5,430 | 0 | 0% |
| P- Private Property | 1,116 | 0 | 0% |
| **Totals** | **46,453** | **4,462** | **10%** |

See appendix A (map A-1) for a visual representation of management areas within Tollgate area.

The following goals are associated with each Forest Plan management area allocation located within the Tollgate project planning area. Detailed descriptions for each area can be found in the Forest Plan.

- **A2 – Dispersed Recreation –** *Goal: Provide motorized recreation in s predominately natural or natural appearing environment with a moderate degree of isolation from sights and sounds of human activity.*
- **A3 – Viewshed 1 –** *Goal: Manage the area seen from a travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities (sensitivity level 1) as a natural appearing landscape.*
- **A4 – Viewshed 2 –** *Goal: Manage the area seen from a travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities as a natural appearing to slightly altered landscape.*
- **A5 – Roaded Natural –** *Goal: Provide dispersed recreation opportunities in an area characterized by a predominantly natural to near natural appearing environment with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment.*
- **A6 – Developed Recreation –** *Goal: Provide recreation opportunities that are dependent on the development of structural facilities for user conveniences where interaction between users and evidence of others is prevalent.*
- **A9 – Special Interest Area –** *Goal: Manage, preserve, and interpret areas of significant cultural, historical, geological, botanical, or other special characteristics for educational, scientific, and public enjoyment purposes. Viewpoints (Bald Mountain overlooking Lookingglass canyon)- sites affording opportunities for viewing forest activities and landscape settings.*
- **B1 – Wilderness –** *Goal: Manage to preserve, protect, and improve the resources and values of the forest wilderness, as directed by the Wilderness Act of 1964.*
- **C1 – Dedicated Old Growth** – *Goal: Provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or overmature forest stands, and promote a diversity of vegetative conditions for such species.*
- **C4 - Wildlife Habitat;** *Goal: Manage Forest Lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphases on size and distribution of*

*habitat components (forage and cover areas for elk, snags and dead and down materials for all cavity users) unique wildlife habitats and key use areas would be retained or protected.*

- **C5 – Riparian (Fish and Wildlife)** – *Goal: Maintain or enhance water quality, and produce a high level of potential habitat capability for all species of fish and wildlife within the designated riparian habitat areas while providing for a high level of habitat effectiveness for big game.*
- **E2 - Timber and Big Game;** *Goal: Manage Forest Lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat.*
- **F4 – Walla Walla River Watershed –** *Goal: Provide high quantity and quality of water and elk habitat effectiveness while sustaining or enhancing other resource values. Management activities would not substantially change the level of water discharge from the National Forest during the May 1 through September 30 period.*

# APPLICABLE LAWS AND REGULATIONS

## National Statutes

Analysis and documentation has been done according to direction contained in the ***National Forest Management Act*** (NFMA), the ***National Environmental Policy Act*** (NEPA), the ***Council on Environmental Quality Regulations*** (CEQ), the ***Clean Water Act*** (CWA), ***Clean Air Act*** (CAA), ***National Historic Preservation Act*** (NHPA), ***Healthy Forest Restoration Act*** (HFRA) and the ***Endangered Species Act*** (ESA), Forest Service NEPA regulation (36 CFR 220), and all other applicable laws, regulations and policies.

## Federal Rules and Regulations

### *Forest Service Manual (FSM)*

The Forest Service Manual contains legal authorities, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff in more than one unit to plan and execute assigned programs and activities. The Forest Service Manual was prepared and is maintained at the Forest Service National Headquarters located in Washington, DC.

### *Forest Service Handbooks (FSH)*

Forest Service Handbooks are the principal source of specialized guidance and instruction for carrying out the direction issued in the Forest Service Manual. Specialists and technicians are the primary audience of Handbook direction. Handbooks may also incorporate external directives with related USDA and Forest Service directive supplements. The Forest Service Handbook was prepared and is maintained at the Forest Service National Headquarters located in Washington, DC.

### *2001 Roadless Area Conservation Rule*

The 2001 Roadless Area Conservation Rule (36 CFR §294.11) includes regulations that provide long-term management direction to Inventoried Roadless Areas (IRAs), and only applies to areas identified and mapped as IRAs in the Forest Service Roadless Conservation FEIS Volume 2, dated November 2000. Some activities proposed under Alternative B of the Tollgate Fuels Reduction Project would occur within portions of the Lookingglass IRA. There is one prohibition listed in the Rule pertinent to the Tollgate Project that prohibits timber cutting, sale, or removal in Inventoried Roadless Areas (36 CFR § 294.13). Trees would be removed within units 26, 38, and a portion of unit 75 which occurs within the boundary of the Lookingglass IRA (Appendix A, Map A3). Additionally, danger trees with an imminent potential of failure would be cut and removed along haul routes that may coincide with the IRA. The prohibition includes exceptions if the Responsible Official determines that certain circumstances exist.

The exception in the 2001 Roadless Area Conservation Rule ("Roadless Rule") to the prohibition on timber cutting, sale, or removal states: *timber may be cut, sold, or removed in IRAs if the Responsible Official determines that one of the following circumstances exists. The cutting, sale, or removal of timber is these areas is expected to be infrequent (36 CFR § 294.13).*

1. *The cutting, sale, or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the Roadless area characteristics as defined in §294.11*
    i. *To improve threatened, endangered, proposed, or sensitive species habitat, or*
    ii. *To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period;*
2. *The cutting, sale, or removal of timber is incidental to the implementation of a management activity not otherwise prohibited by this subpart;*
3. *The cutting, sale, or removal of timber is needed and appropriate for personal or administrative use, as provided for in 36 CFR part 223; or*
4. *Roadless characteristics have been substantially altered in a portion of an IRA due to the construction of a classified road and subsequent timber harvest. Both the road construction and subsequent timber harvest must have occurred after the area was designated an IRA and prior to January 12, 2001. Timber may be cut, sold, or removed only in the substantially altered portion of the IRA.*

In order to comply with the Roadless Area, the activities proposed under any action Alternative may only occur within an IRA if one of the circumstances (1(i), 1(ii,), 2, 3 or 4) outlined in 36 CFR § 294.13 exist. The consistency of the proposed activities with the Roadless Rule will be disclosed in the Specifically Required Disclosures section of Chapter 4 of this document.

## PROJECT RECORD

A project record (40 CFR 1502.21) is being maintained at the Walla Walla Ranger District for this Draft EIS. This project record may be reviewed by appointment, at the Walla Walla Ranger District, 1415 W. Rose, Walla Walla, Washington 99362. This Draft EIS hereby incorporates by reference the entire project record for this Draft EIS.

The project record contains resource specialist reports, addendums to specialist reports, literature citations, and other technical documentation used to support the analysis and conclusions in this Draft EIS. Specialists reports are included for the following: soil, water quality, fish, vegetation, historical range of variability (HRV), noxious weeds, visuals, fuels, air quality, climate change, recreation, visuals, transportation system (roads), heritage, economics, wild and scenic rivers, wilderness, Inventoried Roadless Areas, areas inventoried for wilderness potential, undeveloped lands, terrestrial wildlife species and habitats, management indicator species, migratory birds, biological evaluations and assessments for threatened, endangered and sensitive (TE&S) aquatic, terrestrial, and plant species, and deadwood habitat (DecAID analysis). Other sources of information, documents, published studies, and books referred to in the project file and this document are also included.

Relying on specialists reports and the project record helps implement the CEQ's regulation provision that agencies should reduce NEPA paperwork (40 CFR 1500.4), that environmental documents shall be analytic rather than encyclopedic, and that EISs/EAs shall be kept concise and no longer than absolutely necessary (40 CFR 1502.2). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental effects of the alternatives and how these effects can be mitigated if needed, without repeating detailed analysis and background information available elsewhere. Additional documentation and analyses of project area resources are located in the project file for Tollgate Fuels Reduction Project Draft EIS at Walla Walla Ranger District, Walla Walla, Washington.

## TREATY RIGHTS

The Forest Service, through the Secretary of Agriculture, is vested with statutory authority and responsibility for managing resources of the National Forests. No sharing of administrative or management decision-making power is held with any other entity. However, commensurate with the authority and responsibility to manage is the obligation to consult, cooperate, and coordinate with Indian Tribes in developing and planning management decisions regarding resources on National Forest system land that may affect tribal rights.

Locally, Tollgate project planning area lies within the area ceded to the United States government by the Nez Perce Indians, and the area ceded to the Unites States by the Confederated Tribes of the Umatilla Indians (CTUIR) as a result of the Treaties of 1855.

Elements of respective Indian cultures, such as tribal welfare, land, and resources were entrusted to the United States government as a result of the treaties. Trust responsibilities resulting from the treaties dictate, in part, that the United States government facilitate the execution of treaty rights and traditional cultural practices of the CTUIR and Nez Perce Indians by working with them on a government to government basis in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the respective tribes or the federal government.

Specific treaty rights applicable to that land base managed by the Umatilla National Forest area generally articulated in Article I of the CTUIR Treaty of 1855 and Article III of the 1855 Nez Perce Treaty, include:

*"The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."*

Although the 1855 Treaties do not specifically mandate the federal government to manage habitats, there is an implied assumption that an adequate reserve of water be available for executing treaty related hunting and fishing activities.

General concerns received from the tribes on previous projects reflect the following:

- Potential effects to archeological and traditional properties
- Potential effects to water quality
- Potential effects to fish habitat, including salmonid species federally listed as threatened or endangered under ESA.

- Potential effects to economic recovery

Because tribal trust activities often occur in common with the public, Umatilla National Forest will strive to manage tribal ceded land to enable the execution of tribal rights, as far as practicable, while still providing goods and services to all people.

## PUBLIC INVOLVEMENT

The Forest Service encourages public involvement in the identification of issues and development of alternatives through a process called scoping. Public involvement for this project began when a description of the project was listed in the quarterly 2008 Winter edition of the Umatilla National Forest's Schedule of Proposed Actions (SOPA). On October 19, 2010, letters describing the project were sent on to representatives of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Nez Perce Tribe and to approximately 115 interested organizations, individuals, and other agencies that have indicated an interest in this type of project. The public was invited to comment on this proposed action and any potential conflicts posed by this proposed action. A notice of intent (NOI) to prepare an Environmental Impact Statement (EIS) was published in the Federal Register on October 19, 2010.

Five comment letters were received in response to our initial scoping. All comments were reviewed. These comments were then used to assist in the identification of issues, creation of alternatives to the proposed action, and to determine the extent of environmental analysis necessary for making an informed decision.

After the initial scoping period it was determined that the Forest Plan required amendment in order to implement proposed fuels reduction activities within strategically selected RHCAs. In recognition of this fact and in order to allow interested publics to provide comment, an additional scoping period began in September 2011. Approximately 84 interested individuals, organizations, agencies as well as Tribal governments were notified of this additional scoping period. A second NOI appeared in the Federal Register on September 6, 2011.

A 45-day public comment period will be held on this Draft EIS. The Draft EIS has been posted to the Umatilla's project web site.

## ISSUE IDENTIFICATION

Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives, giving opportunities during the analysis to explore alternative ways to meet the purpose and need for the proposal, while reducing adverse effects and compare trade-offs for the decision maker and public to understand.

An issue should be phrased as a cause-effect statement relating actions under consideration to effects. An issue statement should describe a specific action and the environmental effect(s) expected to result from that action. Cause-effect statements provide a way to understand and focus on the issues relevant to a particular decision.

There is no set of standard issues applicable to every proposal, so consideration is paid by the responsible official to a variety of laws, regulations, executive orders and input, with the help of the interdisciplinary team (IDT). The responsible official approved the issues to be analyzed in depth by the IDT in the environmental analysis. In the case of Tollgate, issues were grouped according to common resources, which include:

- **Fuels reduction and wildfire behavior**: Proposed activities would likely alter potential fire behavior, improve capacity to protect values at risk, and improve opportunities for safe ingress/egress during fire events.
- **RHCA Activities:** Proposed tree cutting and related activities in RHCAs may impair water quality values and wildlife habitat.
- **Old forests:** Proposed tree cutting activities may reduce the quality, quantity, and/or connectivity of important habitat for wildlife, such as old forest, snags, and down woody debris.
- **Roadless Area Characteristics and potential Wilderness suitability**: Proposed tree-cutting activities may impair identified Roadless Characteristics, Wilderness Area Values, and the suitability of Potential Wilderness Areas for Wilderness designation.
- **Visual Resources:** Proposed tree cutting activities may impair the visual characteristics of the 6400 road and Highway 204 corridor.

Additionally, the IDT identified and eliminated from detailed study the issues which are not significant or which have been covered by prior environmental review (1506.3), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere. (40 CFR 1501.7(a)(3))

The ID team recommended, and the responsible official approved, significant environmental issues, measures, and indicators deserving of detailed study. Significant issues used for analysis of environmental effects of each Alternative analyzed in detail are discussed below. Significant issues analyzed in this document (table 1-2), as well as measures and indicators for each (table 1-3), are listed below. Issues were considered deserving of detailed study when they serve, for each Alternative, as a basis for determination of consistency with all applicable laws, rules, and regulations, as well as the relative ability to meet the project Purpose and Need. Additionally, some issues were used to evaluate the relative extent to which an Alternative meets in the Purpose and Need in a manner that minimizes or avoids adverse effects, and addresses unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the National Environmental Policy Act. Issues utilized in this manner are also identified in Table 1-2, and are phrased as cause-effect relationships by combining the causal phrase (italics font in first row of column of Table 1-2) with the effects phrases below.

**Table 1-2 — Issue groups, Issues, and Issue analysis roles for the Tollgate Fuels Reduction Project.**

| **Issue group** | **Issue** (FSH 1909.15, 12.4) *Proposed activities, in whole or in part, may:* | **Issue role in project analysis** | | |
|---|---|---|---|---|
| | | Indicates consistency with **applicable laws, regulations/policy** or opportunities to **reduce adverse effects** | Enables evaluation of Alternatives with respect to the **project Purpose and Need** | Enables evaluation of Alternatives with respect to addressing **unresolved conflicts** of alternative uses of available resources |
| Old forest habitat | Reduce the amount of snags available for wildlife species and large down wood recruitment | X | | X |
| | Alter the characteristics of old forest wildlife habitat | X | | X |

| | | | | |
|---|---|---|---|---|
| | Reduce the connectivity of old forest wildlife habitat | X | | X |
| | Reduce the abundance of trees >21” DBH | X | | X |
| | Affect the habitat and populations of MIS species | X | | |
| | Affect the habitat and populations of Sensitive wildlife species | X | | |
| | Affect the habitat and populations of the northern goshawk | X | | |
| | Affect the habitat and/or populations of other Priority birds / Landbirds / Neotropical migrants | X | | |
| Visual resources | Reduce scenic integrity of areas seen from Forest Road 6400, Road 6401, and Hwy. 204 | X | | X |
| | Reduce scenic stability of areas seen from Forest Road 6400, Road 6401, and Hwy. 204 | X | | X |
| Roadless Areas and potential Wilderness | Alter Roadless Area characteristics | X | | X |
| | Eliminate suitability of areas Potential Wilderness | X | | |
| RHCA activities / hydrology | Impair water quality | X | | |
| | Alter hydrologic function and condition | X | | |
| | Affect water yield | X | | |
| Fuels reduction and potential fire behavior | Alter potential fire behavior (surface, active crown, passive crown, etc.) within the Tollgate WUI | X | X | |
| | Alter fire travel times within the Tollgate WUI | | X | |
| | Reduce spotting distances within the Tollgate WUI | | X | |
| | Allow protection of adjacent and nearby private property in the Tollgate WUI | X | X | |
| | Reduce potential surface fire intensity | | X | |
| | Enable safe ingress/egress when impacted by wildfire at or under 90% weather/fuel moisture conditions | | X | |
| Fisheries | Impair fish habitat | X | | |
| Soil | Increase the degree and extent of Detrimental Soil | X | | |

| | | | | |
|---|---|---|---|---|
| | Condition | | | |
| | Decrease the amount of effective ground cover | X | | |
| | Decrease the amount of coarse and fine woody debris | X | | |
| TES Plant species | Alter the distribution of TES plant species | X | | |
| Economic value | May affect timber values and associated economic activity | X | | |
| Recreation | May impact developed and dispersed camping | X | | |
| | May impact access to and/or opportunities for dispersed recreation activities | X | | |
| | My impact the Recreation Opportunity Spectrum | X | | |
| | My impact the “sense of place” in the Tollgate area | X | | |

**Table 1-3 — Measures and Indicators for Significant Issues identified for detailed study**

| Issue Group | Issue<br>*Proposed activities, in whole or in part, may:* | Measures / Indicators<br>Magnitude<br>*(amount of change of a value)* | Spatial Extent | Temporal Extent / Duration | Likelihood | Speed |
|---|---|---|---|---|---|---|
| Old forests[2] / wildlife | Reduce the amount of snags available for wildlife species and large down wood recruitment | Snag per acre by diameter class (10" DBH and 20" DBH) | Snag Analysis Area | Short (1-10 yrs.)<br>Mid-term (10-50 yrs.)<br>Long-term (>50 yrs.) | Near-certain / Likely / Not likely / Highly unlikely | Immediately following implementation, which is expected to occur over the next 1-5 years |
| | Reduce the amount of old forest wildlife habitat | Acres of Old Forest Multi-story (OFMS) or Old Forest Single-story (OFSS), and as % of Tollgate Project Planning Area | Tollgate Project Planning Area | | | |
| | Reduce the connectivity of old forest wildlife habitat | Acres of old forest connective corridors or adjacent old forest stands | | | | |
| | Reduce the abundance of large-tree (>21" DBH) habitat | Acres of large-tree (>21" DBH) habitat | | | | |
| | Affect the habitat and/or populations of MIS species | 1. % of area Rocky Mountain elk habitat<br>a. Satisfactory cover<br>b. Total cover<br>c. Habitat Effectiveness Index (HEI)<br>2. Acres of well-distributed pine marten habitat<br>3. Pileated woodpecker<br>4. Northern three-toed woodpecker<br>5. Primary cavity excavators | Elk habitat – within activity units and up to 1-mile buffer outside of units<br>All other habitat – Tollgate Project Planning Area | | No effect; May effect; Likely/Not likely to adversely effect | |

[2] "Old Forest" is considered by the Umatilla National Forest to contain multi-story or single-story structure classes with 10 or more live conifer trees per acre greater than or equal to 21 inches in stem Diameter at Breast Height (DBH).

| | | | | | | |
|---|---|---|---|---|---|---|
| | Affect the habitat and/or populations of Sensitive wildlife species | 1. Canada lynx<br>2. Gray wolf<br>3. California wolverine<br>4. Townsend's big-eared bat<br>5. Bald eagle (Sensitive)<br>6. White-headed woodpecker (Sensitive)<br>7. Lewis' woodpecker (Sensitive)<br>8. Columbia spotted frog – Great Basin DPS (Sensitive)<br>9. Rocky Mountain tailed frog (Sensitive) | Tollgate Project Planning Area | | No impact / may impact | Immediately following implementation, which is expected to occur over the next 1-5 years |
| | Affect the habitat and/or populations of the northern goshawk | Acres of potential nesting habitat | | | | |
| | Affect the habitat and/or populations of other Priority birds / Landbirds / Neotropical migrants | Acres of suitable habitat types for each species | | | | |
| Visual resources | Reduce scenic integrity of areas seen from Forest Road 6400, Road 6401, and Hwy. 204 | Degree of visible alteration | Areas visible from Forest Roads 6400, 6401, and Hwy. 204 within the Tollgate Project Planning Area | Number of years or decades | Near-certain / Likely / Not likely / Highly unlikely | Immediately following implementation, which is expected to occur over the next 1-5 years |
| | Reduce scenic stability of areas seen from Forest Road 6400, Road 6401, and Hwy. 204 | Degree to which scenic character (here, the vegetation attribute) can be sustained through time and ecological progression. | | | | |
| Roadless Areas and potential Wilderness | Alter Roadless Area characteristics | Roadless characteristics:<br>1. High quality or undisturbed soil, water, and air<br>2. Sources of public drinking water<br>3. Diversity of plant and animal communities<br>4. Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land<br>5. Primitive, semi-primitive, non-motorized and semi-primitive motorized classes of dispersed recreation<br>6. Reference landscapes | Boundaries of Inventoried Roadless Areas which are partially or completely contained by the Tollgate Project Planning Area | Number of years or decades | Near-certain / Likely / Not likely / Highly unlikely | Immediately following implementation, which is expected to occur over the next 1-5 years |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 7. Natural appearing landscapes with high scenic quality<br>8. Traditional cultural properties and sacred sites and<br>9. Other locally identified unique characteristics | | | | |
| | Alter Wilderness and Potential Wilderness characteristics | Change of "untrammeled, Undeveloped, and Natural" characteristics<br>Change of "outstanding opportunities for solitude and remoteness"<br>Roadless characteristics (described above) | Spatial extent of the North Fork Umatilla Wilderness and PWAs within the Tollgate Project Planning Area | | Near-certain / Likely / Not likely / Highly unlikely | Immediately following implementation, which is expected to occur over the next 1-5 years |
| | Alter social and biophysical characteristics of Non-Inventoried Roadless Area (Non-IRAs; "Other Undeveloped Lands") | Change in biophysical resources<br>Change in social values (apparent naturalness, solitude, remoteness) | Areas identified as "Other Undeveloped Lands" | | | Immediately following implementation, which is expected to occur over the next 1-5 years |
| RHCA activities / hydrology | Impair water quality | 1. Water temperature: 10 yr. avg. of 7-day max. avg.<br>2. Sediment (minor/major increases/decreases) | Code 6 Subwatersheds that contain the Tollgate Project Planning Area: middle reach of the South fork Walla Walla River, North Fork Umatilla River, and Upper Lookingglass Creek. Hydrologic Unit | Number of runoff seasons | Near-certain / Likely / Not likely / Highly unlikely | Within one runoff season following implementation, which is expected to occur over the next 1-5 years |
| | Alter hydrologic function and condition | **1. RHCA Condition**<br>2. **Road interaction with drainage network:** a) road miles in RHCAs, b) road miles/stream miles ratio, and c) number of stream and road intersections<br>3. **Road density:** open and close road miles per square mile | | | | |
| | Affect water yield | Equivalent Treatment Acre model acres as % of HUC 6 watershed | | Number of years or decades | | |
| Fuels reduction and potential fire behavior | Alter potential fire behavior (surface, active crown, passive crown, etc.) within the Tollgate WUI/Analysis area | Acres within Tollgate Project Planning Area of crown fire behavior types under 90th-percentile weather and fuel moisture conditions[3] | Tollgate Project Planning Area | Number of years or decades | Near-certain / Likely / Not likely / Highly unlikely | Immediately following implementation, which is expected to occur over the next 1-5 years |
| | Alter fire travel times | Number of potential miles traveled per | | | | |

[3] 90th-percentile weather and fuel moisture conditions are represented by 5% 1-hour fuel moistures, 60% live fuel moisture, and 15 mph 20-foot wind speeds. Put differently, 10% of weather days are represented by these fuel/weather conditions, or drier.

| | | | | | | |
|---|---|---|---|---|---|---|
| | within the Tollgate WUI | number of hours (e.g., 1.5 miles traveled per 8 hours) during 90%-percentile weather conditions. | | | | |
| | Reduce spotting distances within the Tollgate WUI | Potential spotting distance (miles) during 90%-percentile weather conditions. | | | | |
| | Allow protection of adjacent and nearby private property in the Tollgate WUI | Number of acres within ¼ mile of private land with potential surface fire behavior during 90%-percentile weather conditions. | | | | |
| | Reduce potential surface fire intensity | Potential surface fire flame length (ft.) during 90%-percentile weather conditions. | | | | |
| Fisheries | Harm fishes and/or their habitat | "No Effect / Effect / Adversely affect" based on changes in:<br>1. Water quality<br>2. Temperature<br>3. Chemical contaminants/Nutrients<br>4. Habitat access (barriers)<br>5. Habitat elements:<br>a. Sediment and substrate<br>b. Large woody debris<br>c. Pool frequency<br>d. Large pools<br>e. Off-channel habitat<br>6. Channel condition and dynamics<br>a. Wetted width/Max with/depth ratio<br>b. Streambank condition<br>c. Floodplain connectivity<br>7. Flow/hydrology<br>a. Change in peak flow/base flows (Equivalent Treatment Acre model acres as % of HUC 6 watershed)<br>8. Watershed conditions<br>a. Road density and location<br>b. Disturbance history<br>c. RHCAs<br>d. Disturbance regime | Hydrologic Unit Code 6 Subwatersheds that contain the Tollgate Project Planning Area: middle reach of the South fork Walla Walla River, North Fork Umatilla River, and Upper Lookingglass Creek. | Number of runoff seasons/years | No effect; May effect; Likely/Not likely to adversely effect | |
| Soils | Increase the degree and extent of Detrimental Soil | Existing **DSC** as **percent** of individual treatment units and associated temp roads | Activity units and associated temp | Number of years or decades | Near-certain / Likely / Not likely / Highly | Within one runoff season following implementation, |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Condition | | roads | | unlikely | which is expected to occur over the next 1-5 years |
| | Decrease the amount of effective ground cover | Effective ground cover as a percent of individual activity units | Activity units and associated temp roads | | | |
| | Decrease the amount of coarse and fine woody debris (CWD) | Change in tons/acre of CWD | Activity units and associated temp roads | | | |
| Economic value | May affect timber values and associated economic activity | Present Net Value (PNV) in 2012 dollars | Tollgate project Analysis Area | Number of years | Likely/unlikely | Within one operating season following implementation, which is expected to occur over the next 1-5 years |
| TES Plant species | Alter the distribution of TES plant species | Acres | Tollgate project Analysis Area | Number of growing seasons/years | No effect; May effect; Likely/Not likely to adversely effect | Within one growing season following implementation, which is expected to occur over the next 1-5 years |
| Recreation | May impact developed and dispersed camping | Recreation experience and availability (qualitative values) | Tollgate project Analysis Area | Number of years | Near-certain / Likely / Not likely / Highly unlikely | Immediately following implementation, which is expected to occur over the next 1-5 years |
| | May impact access to and/or opportunities for dispersed recreation activities | Travel access, safety, and desired use (qualitative values) | | | | |
| | My impact the Recreation Opportunity Spectrum | ROS level of development and settings | | | | |
| | My impact the “sense of place” in the Tollgate area | Consistency with characteristics defined in the Recreation Niche Statement | | | | |

## DECISIONS TO BE MADE

This DEIS documents the results of environmental analysis conducted for the proposed action and its alternatives. If a Forest Plan amendment is documented in a decision, the Forest Supervisor of the Umatilla National Forest will be the responsible official. If an amendment is not documented in a decision, the District Ranger will be the responsible official. Decisions to be made include:

1. Whether a Forest Plan amendment should occur at this time?
2. Whether tree-cutting and associated road-related activities should occur as described in this document, and if so, how much and where?
3. What monitoring and/or mitigation measures should be taken or needed?

# CHAPTER 2 – ALTERNATIVES

## INCLUDING THE PROPOSED ACTION

## INTRODUCTION

Chapter 2 describes and shows a comparison of three alternatives selected to be developed in detail, including the proposed action and a no-action alternative. The interdisciplinary team (IDT) developed these alternatives to be within the framework of the Forest Plan and applicable federal and state laws. The alternatives developed in detail were designed to address or resolve issues identified through public involvement and cause and effect analysis. Maps showing activity areas of alternatives considered in detail are located in Appendix A (Maps A3 and A4).

The Chapter begins with a description of the range of Alternatives considered for detailed study, followed by detailed narrative description of the activities included in both action Alternatives. This detailed description is concluded by a summary and comparison of the activities included in each Action Alternative. Following this comparison, monitoring and mitigation measures common to both Action Alternatives are described, followed by description of other Alternatives considered, but not analyzed in detail.

## RANGE OF ALTERNATIVES

Alternatives for this project were designed to address areas of unresolved conflict over alternative uses of existing resources in a manner that meets the project purpose and need. The ID team developed the range of alternatives, project design features, and mitigation measures presented in this chapter based on scoping responses and the purpose and need for action described in Chapter 1 of this document. In total, ten alternatives were considered, seven were eliminated from detailed study and three were analyzed in detail. The IDT recommended and the responsible official approved two action alternatives in addition to a no action alternative.

Under the HFRA, for an authorized hazardous fuel reduction project that is proposed to be conducted in the wildland-urban interface (such as the Tollgate project), the Forest Service is not required to study, develop, or describe more than the proposed agency action and 1 action alternative in the environmental impact statement prepared pursuant to section 102(2) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)) Nevertheless, in an effort to address any potential unresolved conflicts over alternative uses of available resources, the IDT considered one additional action alternative that was based on comments proposed during scoping and meets the purpose and need of the project.

## ALTERNATIVE A – NO ACTION ALTERNATIVE

The no action alternative functions as an environmental reference to which the action alternatives will be compared.

### Introduction:

This alternative serves as the environmental baseline. No fuels reduction activities would occur under this alternative. The no action alternative would result in the continuation of natural processes and trends within the planning area. These existing trends include increasing canopy bulk densities and accumulations of surface fuels over time. Understory would continue to grow and establish itself as a well-defined and pronounced vegetative layer within the planning area. Forest stands would remain highly stocked, and ladder fuels would continue to fill-in and crowd the understory. Accumulation of forest debris would continue to increase natural fuel loadings.

As stands continue to grow in close proximity, competition for limited resources would increase leading to decreased vigor, and stressed vegetation. This would result in increased susceptibility to insects, disease, wind throw, and decadence. Natural fuel loadings would increase accordingly.

Tollgate is home to both permanent and seasonal residences as well as a popular recreational use area. It is expected that the existing public uses of the area would continue and likely would increase over-time. This would have the result of increasing the numbers of values at risk in the event of a wildland fire situation.

# ACTIVITY DESCRIPTIONS

## Surface and Canopy Fuel Reduction Activities

The activities of Alternatives B and C would reduce forest canopy bulk density (while retaining a fully stocked stand) by removing specified crowns, where canopy bulk density is the weight of the available canopy fuel. By reducing the total available fuel in the crowns and providing space between the crowns, this treatment reduces stand potential to produce or sustain crown fire.

The post-treatment residual overstory density would vary depending upon the species composition and individual tree characteristics of the site, but would always exceed 80 $ft^2$/ac of basal area. In general, residual tree density would be increase along with site productivity. In other words, the forest thinning activities are not intended to regenerate new trees, although this is expected to occur in the more productive sites. Activities would tend to favor early-seral tree species such as ponderosa pine and western larch, and favor larger, more fire-resistant trees for retention. Fuels reduction activities would include **Commercial thinning (CT), Non-Commercial Thinning (NCT), Ladder Fuel Reduction (LFR), and Dead and Down Woody Debris Removal (DDR).** These activities are described in detail below and Appendix A, Maps A3 and A4. As an intermediate stand treatment, forest thinning has been used to describe practices ranging from light removal of small understory trees to moderate removal of large overstory trees; with respect to the Tollgate Fuels Reduction Project, any mention of thinning is assumed to be “understory thinning” or “thinning from below” because it involves cutting the smaller-diameter trees and retaining the larger-diameter trees (Figure 2-1).

### *Commercial thinning (CT)*

Commercial thinning activities would be a silvicultural treatment to remove trees in the canopy until a desired residual density is attained. Larger and more fire-tolerant trees would generally receive priority for retention. The size of trees to be removed would be greater than 9 inches in stem diameter at breast height (DBH). Harvest methods would include conventional ground-based4 logging and using a harvester/forwarder[5].

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[4] **Conventional ground based logging system**: This is tractor or skidder yarding on trails spaced approximately 100 feet apart. Skidding equipment would be required to remain on the trails and logs dragged to the landings with one end suspended. Mechanical felling equipment would be used to fall and bunch logs near the trail and be allowed a single pass between skid trails to reduce compaction concerns.

[5] **Harvester/forwarder logging system**: This is a ground-based system using a mechanical feller to cut and manufacture logs, placing them adjacent to the forwarder routes. Limbs are left on the forwarder route to aid in soil protection. The forwarder would pick up logs, place them in bunks and carry them to a landing for decking. This is a total log suspension logging system. Forwarder route spacing would be based on the reach of the felling equipment, 40 to 50 feet.

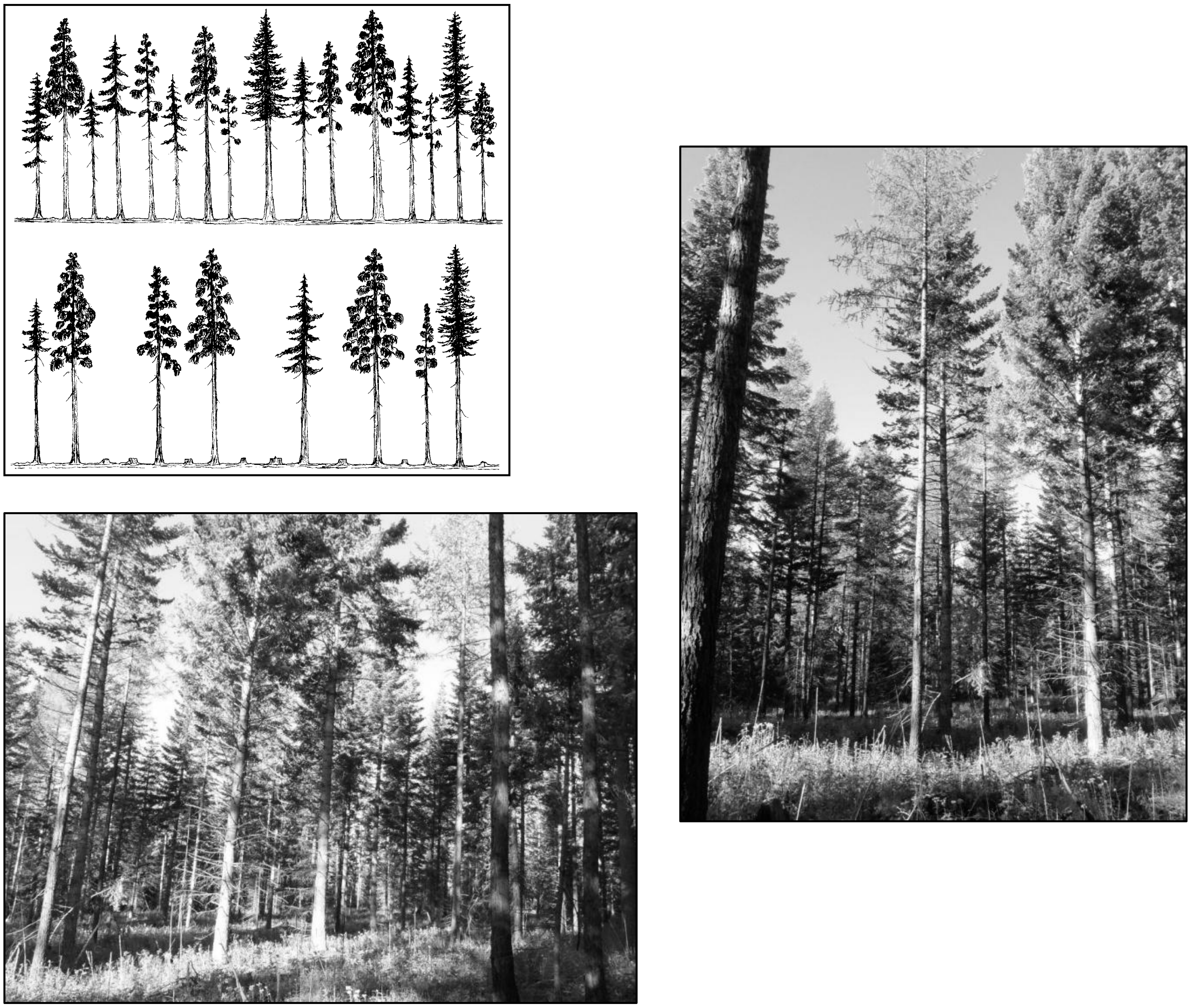

**Figure 2-1 – Examples of thinning in a mixed-conifer forest, with fuels and vegetation effects similar to those expected for most areas included in Alternative B or C in the Tollgate Project. Top-right panel is from Powell (1999).**

### *Non-Commercial Thinning (NCT)*

Thinning of young, even-aged plantation stands in order to reduce the probability of active crown fire activity. This is accomplished by thinning so that remaining tree stems are approximately 20 feet apart, and selecting fire resistant species to retain. Trees less than approximately 9" DBH would be removed, and early-seral, fire-tolerant species would be prioritized for retention.

### *Ladder Fuel Reduction (LFR)*

Removal of understory trees, generally 4-9" in size, away from larger overstory trees. Smaller trees growing beneath larger trees provide a path, or ladder, for fire to climb from the ground into the canopy. By removing these smaller trees, this treatment results in an elimination of the pathway by which a fire would enter the canopy. As long as it is economically feasible, these trees would be removed as a woody biomass product (chips, biochar, pulpwood, or other product). If it is not economically feasible for removal, natural and activity fuel (slash) activities in these units would rely on mastication, grapple piling, hand-piling, pile burning, and/or broadcast “jackpot” burning of ground fuel concentrations. Hand piling would be used in portions of units where visual quality is a concern, mainly along Oregon State Highway 204 and Forest Road (FR) 64. This activity is typically associated with commercial thinning activities.

## *Dead and Down Woody Debris Removal*

In some units, standing dead and down material would be removed to meet fuel reduction objectives. This material would be removed from the stand either as a commercial product (biomass/pulp), shredded and distributed using mastication equipment, or piled and burned at harvest landings.

## *Slash Treatments*

### Slash Piling and Pile Burning

Burning of piles created either mechanically or by hand piling. Burning would occur when the threat of fire spreading from the pile location would be low. A portion of the piles may be covered to aid in the burning the piles in moist conditions. Piles would be lit by hand using drip torches.

### Mastication

Treatment would be comparable to a non-commercial thinning, and would be used to cut trees, as well as grind and distribute activity fuels. The treatment refers to the cutting of trees ranging in diameter breast height (DBH) from 1-5 inches. The focus of the thinning is to reduce competition, remove ladder fuels, and/or create breaks in the continuous canopy of small diameter trees. Where the species are fire sensitive, machine mastication would be used and the resulting chips would be allowed to decompose naturally. Hand felling may be used when machine access is limited by terrain or sensitive resource areas.

## *Logging Systems*

### Conventional Ground-Based (“Tractor”) (whole-tree yarding)

Trees are severed at the stump using mechanized harvesters that hold and cut trees. Trees are laid in bunches. Trees (limbs, tops and boles) are transported to log landings using tract or rubber tired tractors (skidders). Trees are processed at the landing were a de-limber removes branches, tree tops and bucks the trees into logs. Landings are typically larger than other skidder systems to accommodate the large volume of limbs and tops. Soil compaction is typically less than the tractor skidder system. Since trees can be manipulated after severing from the stump, bunches can be staged/bunched thus reducing the number of trips by skidders. In addition, trees ride along the tops reducing soil displacement.

### Forwarder (cut-to-length)

A cut-to-length system would be used to harvest trees down to 5 inches DBH. Landings would be located where the forwarder route meets the road. Forwarder landings would not be constructed; logs would be decked without removing vegetation. Fuel for the equipment would be carried to the site daily. Trees are cut, manufactured into logs, and stacked along the routes by a mechanical harvester. The limbing of trees occurs in the forwarder route to allow both machines used for harvesting and removal to operate over a slash mat. The forwarder places the logs into bunks and carries them to the landing. This is a full suspension, ground based logging system.

### Hand Thinning

Hand thinning involves tree felling utilizing chainsaws. This type of system is typically utilized for the non-commercial thinning (NCT) and ladder fuel reduction (LFR) activities described above.

## *Transportation and Access Management*

Table 2-1 summarizes proposed road-related improvements or actions common to both action alternatives, and supporting the fuels reduction activities described above. To accomplish the proposed timber harvest, and fuel reduction, approximately 46 miles of roads would be used. From the Access and Travel Management Plan, 16.6 miles are closed system roads and all the roads needed for management activities are seasonally open roads, providing for winter recreation activities.

**Table 2-1 - Summary of Transportation Activities**

| Activity | Amount |
|---|---|
| Maintenance: | |
| Standard Maintenance | 46.4 miles |
| Surface rock replacement | 3.5 miles |
| Heavy brushing | 10 miles |
| Rock Sources | 3 |
| Water Sources | 3 ponds, 2 cleanouts |
| Closed System Roads needing to be opened | 16.6 miles |

### Road Maintenance

Road maintenance is needed to protect water quality and aquatic resources, to meet access needs, and to provide safe and efficient road operations. Road maintenance consists of a variety of activity components including surface rock replacement, spot surfacing, roadside brushing, erosion control, logging out, road surface blading, ditch cleanout, slide removal, dust abatement, culvert cleaning or replacement, danger tree removal, and other items that contribute to the preservation of the existing road and its safe use. Dust abatement may be accomplished by a dust palliative or water, on account of volumes to be hauled on roads with mixed used. Snow plowing would be allowed for activities until the winter recreation season begins on December 1.

### Material Sources

These sources are existing and would not need any further expansion.

### Water Sources and Pond Cleanout

Three ponds would be utilized for water sources: FDR 3715030, Swamp Creek Pond at FDR 6400, Hwy. 204 and FDR 3728. Two ponds would be maintained: The Swamp Creek pond off Forest road 6400 near FDR 6406 junction, and the pond off Forest Road 3715030. Several ponds on the Walla Walla Ranger District have lost capacity over time on account of siltation (see design criteria in table 2-7). These ponds are used for road maintenance activities and fire suppression. The availability of water for these activities is essential and often limited at the times of need. By excavating and removing the accumulated silt, the ponds would again provide a water source for forest road and fire management activities, as well as water for wildlife. Pond cleanout would occur during normal instream work windows (Table 2-7).

### Danger Tree Removal/cutting

"Danger trees" (trees which are, within the next 0-10 years, likely to fall in an uncontrolled manner in proximity to unprotected persons and property, and/or limit effective ingress/egress, and thereby pose a substantial risk to human life or property) would be felled and removed along all haul routes used for timber sale activity, as well as both open and closed system roads. If considered economically feasible, these trees would be sold as part of a timber sale. Danger trees that occur within the Riparian Habitat Conservation Areas of units 19, 38, 66 and 75 will be felled and removed. All other danger trees occurring within Riparian Habitat Conservation Areas (RHCAs) outside of the units described above would not be removed, but instead cut and left to provide additional coarse woody debris.

### Temporary Road Construction

Approximately 2.6 miles of temporary road would be constructed to facilitate fuels reduction activities that take the form of timber harvest. Temporary roads would be decommissioned and rehabilitated following treatment activities.

### Road Realignment

Approximately 0.35 miles of Forest Road 3718155 would be realigned. Approximately 0.35 miles of Forest Road 3718155 occurs inside the RHCA of a perennial non-fish-bearing stream and has a native surface (soil). This segment of road would be moved to an upland site, outside of the RHCA. The realignment activities would require the removal of several trees (some greater than 21 inches DBH) to create the road template.

The existing segment of road would be decommissioned and rehabilitated. Forest Road 3718155 is listed as a closed road by the Walla Walla RD Access and Travel Management Plan. Following the completion of fuels reduction activities, Forest Road (FR) 3718155 would be gated and would retain its current status as a closed road.

### Culvert replacement

Three culverts have been identified in need of repair or replacement. The locations are along Forest Roads 3715030, 3700040 and 6400100. The culvert on 3715030 has a wildlife pond below the outlet so replacement can occur during the normal operating season. After the installation the pond would be drawn down below the outflow and deepened to provide adequate water for wildlife, grazing, fire suppression and road maintenance. All culverts would be removed with an excavator; the old culverts would be disposed properly off lands managed by the National Forest System. All the culverts would be sized to match the drainage area above the installation. All culverts would be bedded in native material, installed on grade; there would be no water diversion during removal or installation. Culvert replacement would occur during normal instream work windows (Table 2-7)

## ALTERNATIVE COMPARISON

A summary of activities occurring as a result of adopting any Alternative, including the No-Action Alternative, are described below in Table 2-2. Please note that acreage values are approximate due to rounding errors and environmental factors occurring prior to and during activity implementation. Environmental factors include, but are not limited to blowdown, rain events, insect outbreaks, animal damage, wildfire, etc. A map showing the locations of activities occurring under Alternatives B and C is included in Appendix A (Maps A3 and A4)

**Table 2-2 — Activity summary for Alternatives A, B, and C**

| | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| **Reduction of Amount and Continuity of Surface and Canopy Fuels** | | | |
| Commercial thinning of live and dead trees (CT) | 0 acres | 3,445 acres | 3,285 acres |
| Non-commercial thinning of live and dead trees in even-aged plantations (NCT) and the forest understory (LFR) | 0 acres | 885 acres | 725 acres |
| Down and Dead woody debris Removal (DDR) | 0 acres | 300 acres | 280 acres |
| Mastication | 0 acres | 1,200 acres | 1,015 acres |
| Hand-pile burning | 0 acres | 500 acres | 330 acres |
| Total area affected[6] | 0 acres | 4,330 acres | 4,010 acres |
| **Tree Cutting and Yarding Systems** | | | |
| Conventional ground-based (“tractor”) | 0 acres | 2,660 acres | 2,520 acres |
| Harvester-forwarder | 0 acres | 785 acres | 770 acres |
| Hand thinning only | 0 acres | 885 acres | 720 acres |
| **Roads Used for Project Activities** | | | |
| Open Roads used for timber and/or biomass hauling | 0 miles | 30 miles | 30 miles |
| Gated closed system roads used then re-closed | 0 miles | 16 miles | 16 miles |
| Temporary roads constructed (de-commissioned after use) | 0 miles | 2.6 miles | 2.6 miles |
| Road realignment | 0 miles | 0.35 miles | 0.35 miles |
| **Activity Topics of High Interest** | | | |
| Removal of trees allowed equal to or greater than 21 inches DBH other than for safety or operational needs | 0 acres | 338 acres | 0 acres |
| RHCA activities | No | Yes (Table 2-3) | Yes (Table 2-3) |
| Danger Tree Removal along Haul Routes | No | Yes | Yes |
| IRA activities | 0 acres | 243 acres | 0 acres |
| Forest Plan Amendment | No | Yes | Yes |

# ACTIVITIES SPECIFIC TO ALTERNATIVE B

Alternative B is the Tollgate Fuels Reduction Project Proposed Action and Preferred Alternative, and is summarized above in Table 2-2 . Based on public scoping comments and Interdisciplinary Team (IDT) discussions several modifications were made to the Tollgate Fuels Reduction proposed action[7]. These changes are reflected in Alternative B. A map showing the locations of activities occurring under Alternative B is included in Appendix A (Map A3)

[6] DDR, Mastication, and/or hand-pile burning occur concurrently within the same locations as CT, NCT, and/or LFR activities, and are not included in the Total Area Affected acres.

[7] The Proposed Action for the Tollgate Fuels Reduction project was developed through a collaborative process with interested members of the local community. This collaboration took the form of several meetings during 2008-2009. The resulting proposed action was used for the Forest Service’s public scoping efforts and can be found on the Umatilla National Forest website (**http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=28356**).

## Design and Rationale

In response to the purpose and need described in Chapter 1, the Walla Walla Ranger District proposes surface and canopy fuels reduction activities to improve protection to adjacent private lands and public/private infrastructure, change potential fire behavior within Tollgate WUI, and lower fire hazard to reduce the risk of potential adverse wildland fire effects on values at risk within the Tollgate planning area. Consistent with basic principles recommended by Agee and Skinner (2005), Tollgate Fuel reduction activities would reduce surface fuels, increase the height to live tree crowns, decrease crown density, and retain large trees of fire-resistant species. Thinning and removal of surface fuels can be a useful tool to achieve these objectives (Agee and Skinner 2005).

Alternative B was designed to move forest active crown fire susceptibility from high to moderate using basal area as the quantifying metric (moderate crown fire susceptibility is defined as basal areas of 43-120). Typical target basal area's assigned in the prescriptions are 80-120 (the high end of moderate crown fire susceptibility, but adequate given stand dynamics, and fire behavior modeling). Unit placements within the proposed action were based on two qualifying criteria: proximity to private land and structures (within ¼ mile), and at strategic locations at the interface of the plateau and surrounding canyon lands (modeling of major fire travel paths informed the placement of these units along the "rim").

These activities serve a twofold protection strategy. The first of these strategies is the direct protection of private property and structures by placing activities directly adjacent to, and extending out ¼ mile of these values. The second strategy addresses the need to reduce the severity of future fire events, provide for safe ingress/egress, and reduce fire duration on the area as a whole with the placement of activities in strategic locations. These activities are not linked to specific values rather they are designed as a proactive attempt to provide for firefighter and public safety and reduce the costs of future fire occurrences.

## Proposed Forest Plan Amendment

Umatilla Forest Plan amendment #10, commonly referred to as Pacfish, is interim direction designed to "arrest the degradation and begin the restoration of aquatic habitat and riparian areas on lands administered by the Forest Service and BLM; it applies to watersheds outside the range of the northern spotted owl that provide habitat for Pacific salmon, steelhead, and sea-run cutthroat trout."

Pacfish uses a buffer concept to establish riparian habitat conservation areas (RHCA) along both sides of streams, rivers, lakes and other wetlands. RHCA widths extend from the edge of the active stream channel and they vary with stream class and whether a stream is fish bearing or not. RHCAs can be established using specified feet of slope distance (such as 300 feet on either side of perennial, fish-bearing streams) or in numbers of "site-potential tree heights" (such as 2 site-potential tree heights for perennial, fish-bearing streams). The interim RHCA widths established by the Pacfish environmental assessment can be adjusted during watershed analysis or after site-specific analysis presenting a rationale for RHCA modifications.

Timber harvest activities are prohibited by the Pacfish amendment except in the following situations (see timber management standards, page C-9, in USDA Forest Service and USDI Bureau of Land Management 1994):

3. For catastrophic events such as fire, flooding, volcanic, wind or insect damage that result in degraded riparian conditions, and where present and future wood y debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and adverse effects on listed anadromous fish can be avoided, or
4. When applying silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a

> manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on listed anadromous fish.

The activities included under Alternative B and occurring within Pacfish RHCAs are intended to reduce surface and canopy fuel loading, and not to acquire desired vegetation characteristics needed to attain Riparian Management Objectives. Furthermore, no catastrophic events or disturbance-caused damage has resulted in degraded riparian conditions. Therefore, the proposed activities in RHCAs do not fall under these situations and are thus not exempt from Pacfish prohibitions on commercial timber cutting within the RHCA.

In order to meet the project purpose and need, Alternative B would include a site and project-specific Forest Plan amendment which would allow for the proposed fuels activities within Pacfish Riparian Habitat Conservation Areas (RHCAs) of units 19, 38, 66, and 75. Specifically, the amendment would modify applicable Pacfish standards and guides regarding activities within RHCAs in the units identified above, to allow previously prohibited activities to occur. The amendment is site specific to the Tollgate Fuels Reduction project and would remain valid only during implementation of this project.

The Forest Plan amendment would have two parts (TM-1c and FM-1a) and allow the use of timber harvest for hazardous fuels reduction from Category 2 RHCAs which occur within units 19, 38, 66 and 75. This amendment would allow silvicultural practices to improve public and firefighter safety and allow the use of various fuel treatment practices to manage for desired fire behavior that would allow safe and effective suppression efforts. The amendment applies only to the Tollgate Fuels Reduction Project.

Currently, Pacfish timber management standards and guidelines include one item (TM-1), which prohibits timber harvest within RHCAs. The two exceptions to this prohibition are described above and listed under TM-1 as TM-1a and TM-1b. The following proposed amendment (TM-1c) to Pacfish standards and guidelines would be added as an additional exception to the prohibitions described in TM-1, and would apply to the RHCAs within activity units 19, 38, 66, and 75. **TM-1c** would read as follows:

> Apply silvicultural practices for Riparian Habitat Conservation Areas(RHCAs) that occur on Category 2 streams (permanently flowing non-fish bearing streams) within units 19, 38, 66, and 75 of the Tollgate Fuels Reduction project, to acquire desired vegetation characteristics where needed to achieve project specific fuels reduction objectives. Apply silvicultural practices in a manner that avoids adverse effects on ESA-listed anadromous fish. This is a project and site-specific Forest Plan Amendment that applies only to the RHCAs within units discussed above, for the Tollgate Fuels Reduction project.

Pacfish also requires that fuels management strategies, practices, and actions do not prevent attainment of Riparian Management Objectives, and minimize disturbance of riparian ground cover and vegetation (Pacfish standards and guidelines, item FM-1). To the extent that this requirement prohibits mechanical removal of surface and canopy fuels within the RHCAs in units 19, 38, 66, and 75, a Forest Plan amendment is also needed to allow these activities to occur. Thus, in order to meet the project purpose and need as described in Chapter 1, the Tollgate project includes an amendment to the Pacfish standards and guidelines with respect to fuels management.

The amendment would both modify and supplement item FM-1. The first sentence of FM-1 would be modified to read: “Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation, except as described below in FM-1a.” The supplement to FM-1 would be listed as **FM-1a**, and would read:

> Design fuel treatment and fire suppression strategies, practices, and actions within the riparian conservation areas (RHCAs) of Category 2 streams (permanently flowing non-fish bearing

streams) found within units 19, 38, 66 and 75 of the Tollgate Fuels Reduction project so as to maintain channel stability and prevent adverse effects to riparian and aquatic habitat conditions.

## Activities within RHCAs

Alternative B would treat Riparian Habitat Conservation Areas (RHCAs) that hold strategic importance within the analysis area. RHCAs located within units 19, 38, 66, and 75 would be affected by fuels reduction activities. A buffer with no fuels reduction activities will be retained 30-100 feet beyond each side of the stream channel (Table 2-3). These RHCAs would be treated with mechanical means such as timber harvest. Logging systems would be designed so that no harvest or skidding would cross active stream channels. Only RHCAs within the units identified above would receive treatment, all other RHCAs would receive the standard Pacfish buffers.

## Lookingglass Inventoried Roadless Area Activities

The project proposes fuels reduction activities within the Lookingglass Inventoried Roadless Area (IRA), summarized below in Table 2-4.

Alternative B would treat approximately 206 acres within the IRA. All of the treatment acreage occurs adjacent to private property and/or Forest Road 6400. The following units are located entirely or have portions within the IRA boundary: 26, 38 and 75.

Units 38 and 75 would be treated with commercial timber harvest, while unit 26 is a non-commercial thinning unit.

**Table 2-3 — Units containing RHCAs that would be treated in Alternative B**

| | | | Existing Condition | | | Post-Treatment Condition | | | Distance to ESA fish | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Acres | RHCA Area Treated | Basal Area | Trees/Acre | Canopy Cover | Basal Area | Trees/Acre | Canopy Cover | Steel-head | Bull Trout | No-cutting Stream buffer | Channel Length Treated |
| 19 | 17 | 4 acres | 180 | 170 | 50% | 120-140 | 109 | 40% | 1½ miles | 1½ miles | 50 ft. | 600 ft. |
| 38 | 87 | 8 acres | 240 | 250 | 80% | 80-100 | 170 | 50% | ½ mile | ½ mile | Minimum 50 ft./up to 100 ft. | 1200 ft. |
| 66 | 40 | 8 acres | 280 | 250 | 80% | 100-120 | 170 | 50% | 1 mile | 1 mile | Minimum 30 ft./up to 50 ft. | 1200 ft. |
| 75 | 52 | 5 acres | 200 | 250 | 80% | 140-160 | 170 | 50% | ¼ mile | ¼ mile | Minimum 50 ft./up to 100 ft. | 600 ft. |

**Table 2-4 — Units within Lookingglass IRA that would be treated by Alternative B**

| Unit | Unit Acres | Activities |
|---|---|---|
| **26** | 104 | LFR |
| **38** | 87 | CT, LFR |
| **75** | 52* | CT, LFR, DDR |

*Approximately 15 acres (29%) of total unit occurs within the IRA boundary.

No activities would occur within the Walla Walla River IRA or North Fork Umatilla Wilderness.

## Removal of 21 in. and greater trees

Approximately 340 acres would receive thinning that would include some 21 inch or greater trees, summarized below in Table 2-5. The removal would generally occur within units 45, 83, 84 and 95. These units primarily occur adjacent to the North Fork Umatilla Wilderness. Additionally, where necessary, for safety and/or logging corridors, incidental trees greater than 21 inches may be removed.

**Table 2-5 — Units where removal of trees greater than 21 inches are proposed to occur**

| Unit | Acres* | Activities |
|---|---|---|
| 45 | 104 | CT, LFR |
| 83 | 102 | CT, LFR |
| 84 | 85 | CT, LFR |
| 95 | 47 | CT, LFR |
| As needed through planning area for safety. | N/A | Dependent on prescription of unit where tree occurs. |

*Acreage Represents total acres for the unit and not the number of acres that will have trees greater than 21 inches removed. In general, trees >21" DBH occur in isolated groups/patches which are much smaller than the larger activity units.

# ACTIVITIES SPECIFIC TO ALTERNATIVE C

This alternative was developed to be responsive to significant issues for the Tollgate Fuels Reduction project raised during the scoping process, and attempts to address unresolved conflicts over the alternative uses of available resources, while being consistent with the Purpose and Need for action described in Chapter 1. A map showing the locations of activities occurring under Alternative C is included in Appendix A (Map A4)

## Design and Rationale

During the development of Alternative C, some the significant issues identified for the Tollgate Fuels Reduction project that suggested the possibility of unresolved conflicts over alternative uses of available resources. Specifically, scoping comments suggested the potential for unresolved conflicts around the topics of Roadless Areas, Potential Wilderness Areas (PWAs), RHCAs, and trees greater than or equal to

21" inches DBH. A design for Alternative C was formulated to attempt to address potential areas of unresolved conflict as well as the project Purpose and Need (described in Chapter 1) by:

- Avoiding entering Roadless Areas, or by modifying Roadless activities to minimize impacts
- Avoiding the removal of trees greater than 21" DBH
- Avoiding tree cutting within PWA's
- Avoiding activities within all RHCAs except those immediately adjacent to vulnerable structures

The IDT reviewed the initial intent for project design for the proposed action. Unit placements within the proposed action were based on two qualifying criteria: proximity to private land and structures (within ¼ mile), and at strategic locations within likely wildfire travel paths at the interface of the plateau and surrounding canyon lands. Based on this review, and given the existence of potentially unresolved conflicts identified above, the IDT found that the importance of those activities designed to directly protect private property and structures (the first prong of the twofold treatment strategy) is the highest priority. To reiterate, these activities are located within ¼ mile of structures and private property, and designed to provide protection to these values from fires as they approach or emerge in the area (specifically, these activities significantly reduce spotting distance, crown fire potential, and crown fire travel times). These activities are considered critical to meeting project objectives. As such, activities which occurred within this category (which includes activities within the RCHA of Unit 19) were not modified from Alternative B.

The areas of potential unresolved conflict over alternative uses of available resources (listed above) were considered in light of the critical elements of the Purpose and Need identified above, and informed the design of Alternative C. Alternative C addresses the project Purpose and Need (although perhaps not to the extent of Alternative B), and is responsive to significant issues and potential areas of unresolved conflict in the following ways:

- Activities within Lookingglass IRA and other Potential Wilderness Areas:
    - No activities would occur within the Lookingglass IRA or any areas on the Potential Wilderness inventory.
- Activities within Riparian Habitat Conservation Area (RHCA):
    - Under Alternative C, only the RHCA within unit 19 would be treated. Unit 19 would receive treatment as a result of its direct adjacency to private infrastructure, its topographic orientation to the North Fork Umatilla Wilderness, and fire behavior modeling of potential fire travel paths.
- Removal of trees greater than 21 inches DBH:
    - Under Alternative C, no trees greater than 21 inches DBH would be removed except in the following circumstances:
        - Trees greater than 21 inches DBH may be removed for incidental purposes such as being necessitated by safety concerns and/or operational needs.

Alternative C is summarized above in Table 2-2 . Design features and management requirements common to all action alternatives are described in Table 2-7, with the exception of items pertaining to activities within RHCAs, in which case would apply to only unit 19 for Alternative C (Table 2-6).

## Proposed Forest Plan Amendment

For identical reasons as discussed earlier with respect to the Forest Plan amendment proposed under Alternative B, a Forest Plan amendment would be required to allow timber harvest within Pacfish RCHAs for units included under Alternative C. As a result of the process described above in the Design and Rationale section for Alternative C, only the RHCA in Unit 19 was selected for fuels reduction activities. The Forest Plan amendments for Alternative C would be identical in wording to those described above under Alternative B, except that they would pertain to unit 19 only. Similarly, the amendment would be specific over time and space to the Tollgate Fuels Reduction Project only.

## RHCA Activities

Alternative C would treat the Riparian Habitat Conservation Areas (RHCA) within unit 19. This RHCA would be treated with mechanical means such as timber harvest. Logging systems would be designed so that no harvest or skidding would cross active stream channels.

Only the above mentioned RHCAs within the unit identified above would receive treatment under Alternative C. All other RHCAs within the Tollgate Project Planning Area would receive the interim Pacfish buffers.

**Table 2-6 — Units containing RHCAs that would be treated in Alternative C**

| | | | Existing Condition | | | Post-Treatment Condition | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Acres | RHCA Area Treated | Basal Area | Trees/ Acre | Canopy Cover | Basal Area | Trees /Acre | Canopy Cover | Distance to ESA fish | | No Treatment Buffer | Channel Length Treated |
| | | | | | | | | | Steelhead | Bull Trout | | |
| 19 | 17 | 4 acres | 180 | 170 | 50% | 120-140 | 109 | 40% | 1½ miles | 1½ miles | 50 ft. | 600 ft. |

## Lookingglass Inventoried Roadless Area Activities

No treatment activities will occur within the Lookingglass IRA boundary under Alternative C.

## Removal of 21 in. and greater trees

No trees greater than or equal to 21 inches DBH would be removed under Alternative C, unless they pose a safety concern or are needed for operational corridors.

# DESIGN FEATURES / MONITORING COMMON TO ACTION ALTERNATIVES B AND C

## Design Features

Design features and management requirements common to all action alternatives are described in Table 2-7.

**Table 2-7 — Design Features and Management Requirements common to all Action Alternatives**

| Objective | Task | Time -line |
|---|---|---|
| **HYDROLOGY/WATER QUALITY** | | |
| **Pacfish Protection of Riparian Habitat Conservation Areas (RHCAs)** | 1. Stream and riparian protection is based on the Forest Plan as amended by Pacfish . Pacfish standards and guidelines related to timber harvest, roads, and fire apply to this project and are incorporated by reference into this document. No harvest would take place in RHCAs, with exception of RHCAs occurring within units 19, 38, 66, and 75 for Alternative B, or unit 19 for Alternative C. No other RHCAs would have harvest activity and are described below as they apply to this project.<br>**Category 1** - Fish-bearing streams: RHCAs consist of the stream and the area on either side of the stream extending 300 feet slope distance from the edges of the active stream channel.<br>**Category 2** - Perennial non-fish-bearing streams: RHCAs consist of the stream and the area on either side of the stream extending 150 feet slope distance from the edges of the active stream channel.<br>**Category 3** - Ponds, lakes, reservoirs, and wetlands greater than 1 acre: RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or the extent of the seasonally saturated soil, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.<br>**Category 4** - Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas: This category includes features with high variability in size and site-specific characteristics. At a minimum the RHCAs must include: the area from the edges of the stream channel, wetland, landslide, or land-slide prone area to a distance equal to the height of one site-potential tree, or 100 feet, whichever is larger. | Prior to and during activity |
| **Activities within RHCAs of Units 19, 38, 66 and 75** | 2. Do not cross channels or operate within the inner gorge of channels with heavy equipment.<br>3. Standing trees and down wood will not be cut or removed from within prescribed buffers (Tables 2-3 and 2-6).<br>4. Equipment will not operate on wet soils.<br>5. No material will be removed from wet areas.<br>6. RHCA mineral soil exposure will be limited to 10% or less<br>7. lash will be hauled into the unit to mulch any soil exposed within RHCAs. | During Activit y |
| **Pond Cleanout Activity** | 8. Pond clean out will occur during the instream work window for the Swamp creek pond (July 1 through August 15) and other in-channel ponds. Off-channel pond cleanout activity may occur throughout the operating season.<br>9. Ponds will be pumped prior to clean out so that outflow from the pond does not occur during cleanout<br>10. Material will be hauled out of the RHCA and deposited in designated waste sites.<br>11. Pond outlets will be maintained in a stable condition and in-stream channel dams will not be enlarged. | During and post activity |

| Objective | Task | Time-line |
|---|---|---|
| **Protection of water quality (Clean Water Act)** | 12. Implement and monitor Design Criteria and Best Management Practices (BMPs) and incorporate findings into project implementation (See Appendix D for a listing of National Core BMPs selected for project).<br>13. FR3715030 and 6400100 culvert replacements will be replaced with correctly sized culverts, bedded in native material, and placed on natural stream grades. Replacements will take place during the Oregon State instream work window (see fish/aquatic habitat section below) or if not perennial, during dry conditions.<br>14. Danger trees located in RHCAs will be specially marked for felling and not removed from the RHCA.<br>15. Ground based equipment will cross ephemeral draws and channels at sites pre-approved by the responsible Forest official, and crossings will be minimized.<br>• Logging systems will be designed to minimize crossing ephemeral draws. Ephemeral draws will not be crossed where equipment will cause bank breakdown.<br>• Mechanical fuels treatments will use existing trails created by logging operations when crossing ephemeral draws and channels.<br>• In ephemeral draws, 25 feet each side of the channel centerline and 1000 linear feet of channel, retain all wood embedded in the soil and maintain a number of down woody debris pieces equal to or exceeding the number and size of pieces specified for snag retention below.<br>16. Ephemeral draws and stream channels will not be used as forwarder trails, landing sites, slash or fuels pile locations, or as road locations.<br>17. Commercial use of National Forest roads shall be suspended when commercial contract or permit operations create a continuous discharge of sediment into live streams that result in an increase on turbidity. This may be from pumping of saturated fines creating sediment-laden water on and/or from the road surface. Visual evidence of this may be identified by the increase in turbidity in live running streams evident at points downstream from the outflows of culverts, ditch-lines, or fords (Umatilla NF Road Use Rules).<br>18. Timber sale purchaser will prepare a spill containment plan that will ensure that spilled fuel will not leave the site. Fuel will not be stored within any RHCA.<br>19. Rock surfacing will be used on haul routes that cross or otherwise enter RHCAs.<br>20. Where the proposed haul routes encounter wet areas, new drainage structures and surface rock will be installed.<br>21. Unit 61 will be accessed directly from State Highway 204, no streams will be crossed. | Prior to, during, and post activity |
| **FISH/AQUATIC HABITAT** | | |
| **Protection of fish habitat** | 22. State of Oregon in-stream work window (from July 1 to September 15) will be used to replace culverts in stream channels with perennial flows.<br>23. When water drafting, sources will be monitored for reduced flows. When and if low flow (less than 5 CFS) conditions are identified, spring-fed ponds will be used as sources prior to the use of stream sources whenever feasible. When | Prior to, during, and post |

| Objective | Task | Time-line |
|---|---|---|
| | spring-fed ponds are not feasible, stream sources can be used but pumping rates must not reduce flows to less than 5 CFS. If the stream has less than 10 CFS, stream flow cannot be reduced more than 1/10th of the existing stream flow and will discontinue drafting if this amount is exceeded.<br>24. During road maintenance and snow plowing side casting of materials will not occur where these materials could be directly or indirectly introduced into a stream, or where the placement of these materials could contribute to the destabilization of the slope.<br>25. Slough and waste materials removed during road maintenance activities, including ditch and culvert cleaning, will be deposited in approved disposal areas outside of RHCAs. For erosion control and stabilization the disposal site will be seeded with native seed.<br>26. When masticating equipment is used to remove brush at stream crossings it will be used in such a way as to not cause ground disturbance and to prevent sediment delivery to a live stream. Brush and other standing vegetation that provides shade to streams will be maintained except where public safety is an issue.<br>27. Ditches will only be maintained where the water captured by the ditch is not able to be transported to the adjacent drainage structure that carries the water across the road.<br>28. Refueling, repair, and maintenance of equipment will be done at landings or on forest roads outside of RHCAs. | activity |
| **AIR QUALITY** | | |
| **Protection of air quality (Clean Air Act)** | 29. Oregon State Smoke Management Plan regulations will be followed to protect air quality and avoid smoke intrusion into sensitive areas. | During activity |
| **SOILS** | | |
| **Protection of soil during burning** | 30. Retain as much duff as possible, while meeting fuel reduction objectives to control erosion and provide organic matter.<br>31. With jackpot or underburning, soil exposure will be limited to 20 percent or less of the area on steep slopes. | During, and post activity |
| **Erosion control on fire lines** | 32. Fireline construction will only occur where necessary. Any fireline constructed will be to minimal standard. Locations will be evaluated post-harvest. All firelines will be waterbarred and seeded at project completion, as needed. | Prior to, during and post activity |
| **Soil protection/erosion control** | 33. Logging and hauling of logs will occur only on dry or frozen ground.<br>34. Maximize use of existing skid trails, landings, and temporary roads or closed roads.<br>35. Mastication equipment will work over slash matts to the extent possible, working from the interior of units.<br>36. Units 1, 3, 10, 25, 29, 46, 55, 61, 67, 68, 73, 76, 90, 101, 105 will have designated skid trails pre-flagged to minimize new Detrimental Soil | Prior to and during activity |

| Objective | Task | Time-line |
|---|---|---|
| | Conditions (DSC)<br>37. At least one acre (or more) of unit 3 will need to be rehabilitated to bring the unit within Forest S&Gs.<br>38. Create drain dips or water bars where water has potential to erode the skid trail or roadbed post-harvest as per the road maintenance and reconstruction plan. Placement of harvest slash on road surface alone will not be considered satisfactory.<br>39. Protect fragile soils associated with seeps located in unit 66with a 100-foot no equipment buffer.<br>40. No commercial harvest or ground based activities will take place were land slumps or high potential for mass wasting occur (deep-seated soil and rock movement) within units 1, 3, 4, 53, 67, 69, 70, 87, and 89 ( approximately 89 acres).<br>41. Fully restore temporary road compaction by scarification of compaction or subsoiling to an appropriate depth; followed by reseeding upon completion of project. Seed with native seed mix as prescribed by botanist. Place slash, adjacent woody debris or duff over disturbed ground to resist rain splash erosion, provide a ready seed source and detour use. Existing templates used as temporary roads will be restored to this level.<br>42. Subsoiling is to be implemented in units with post-project levels exceeding 20% of the unit area. Recommendation for the amount and location of subsoiling will be made by the Forest Soil Scientist and will be based on site and soil characteristics.<br>43. For maintaining soil productivity the upper limit of the following ranges for coarse woody debris materials should be retained to levels specified below:<br>• 5 to 20 tons per acre for warm dry ponderosa pine and Douglas-fir ecotypes<br>• 10 to 30 tons per acre for cool Douglas-fir ecotypes<br>44. All logging systems will provide at least one-end suspension.<br>45. Yarding will be spaced for optimum efficiency and minimum soil disturbance. Forwarder trails will average 50 feet apart, except where converging. Conventional system trail spacing will average 100 feet. Skyline system corridors will average 150 feet apart. All trails will be approved prior to use.<br>46. Use existing trail system as much as possible. Ground based equipment will operate when soil conditions are dry enough to support machinery adequately.<br>47. No ground-based equipment will operate on sustained slopes greater than 35% in order to reduce the potential for soil movement.<br>48. Minimize exposure of soils and keep erosion control current.<br>49. Landings will be designed to minimize size and constructed to minimize adverse effects and provide for safe operations.<br>50. During and upon completion of harvest activities erosion control measures will occur on forwarder trails and landings.<br>51. Seed all soil exposed by operation using native seed. Waterbar and mulch as necessary to prevent erosion.<br>52. Post-activity exposed mineral soil will be treated as necessary to reduce soil | |

| Objective | Task | Time-line |
|---|---|---|
| | erosion and compaction. This may include seeding, installation of waterbars, mulching with native material, or subsoiling. Where possible and needed, skid trails will be subsoiled and/or have logging slash and large wood left.<br>53. Temporary roads - install drainage if roads remain over-winter, after use subsoil, pull berms into roadbed, re-vegetate with native seed, mulch with existing slash, and camouflage entrance to discourage use. | |
| | **INVASIVE PLANT SPECIES** | |
| **Control and prevention of invasive plants (noxious weeds)** | 54. Noxious weed sites will be treated consistent with Umatilla National Forest's Invasive Plants Treatment Project (EIS), decision dated July 2010 and consistent with the 2005 Region 6 Invasive Plant ROD that amended the Umatilla Forest plan in March 2006.<br>55. All gravel, fill, sand stockpiles, quarry sites, and borrow material will be inspected for the presence of invasive plants before use and transport. Use only gravel, fill, sand, and rock that are judged to be weed seed free by District or Forest weed specialist.<br>56. Road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants will be conducted in consultation with District or Forest-level invasive plant specialists. Invasive plant treatment and prevention practices will be incorporated as appropriate. This may include minimizing soil disturbance, but will not preclude it.<br>57. Project or contract maps will show currently inventoried high priority noxious weed infestations as a means of aiding in avoidance and/or monitoring.<br>58. Prior to moving onto the Forest, reasonable measures will be taken to insure that all off-road equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. In addition, prior to moving off-road equipment from a cutting unit known to be infested with invasive species to any other unit that is believed to be free of noxious weeds, reasonable measures will again be taken to make sure equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds (timber sale contract provision B/BT 6.35 or equivalent provision).<br>59. Noxious weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If state certified straw and/or mulch is not available, individual forests should require sources certified to be weed free using the North American Weed Free Forage Program standards, or a similar certification process<br>60. All soils disturbed by project activities will be re-vegetated with certified weed free native seed.<br>61. Logging system design will consider the objectives of maintaining ground cover and minimizing ground disturbance. Forest Plan standards and guidelines for ground and soil disturbance will be followed.<br>62. Helicopter landings and parking areas will not be located in known areas of invasive plants. | Prior to, during, and post activity |
| | **CULTURAL RESOURCE** | |
| **Preservation** | 63. Cultural resource surveys have been conducted within the project area. | Prior |

<table>
<tr><th>Objective</th><th>Task</th><th>Time-line</th></tr>
<tr><td>and protection of archaeological sites</td><td>Cultural/historic sites will be protected by avoiding them.<br>64. Since some project activities will be implemented over multiple years, project leaders will contact the assistant Forest Archaeologist prior to project implementation for monitoring and avoidance purposes.</td><td>to, and during activity</td></tr>
<tr><td colspan="3">WILDLIFE</td></tr>
<tr><td>Maintain dead wood habitat (timber harvest)</td><td>65. Snag Retention – Maintain dead wood habitat and green replacement trees at or beyond levels identified in the table below. All snags retained will be greater than 20-inch diameter at breast height, but if there are not enough snags of this size, all large snags will be left and some smaller snags will be retained to make up the difference. Tree species and soundness at the base will also be considered. The tree species most preferred are ponderosa pine, western larch, and Douglas-fir. See the following table.
<table>
<tr><td colspan="6">Snag and down wood retention per acre by plant association group</td></tr>
<tr><td></td><td>Ponderosa pine</td><td>Mixed conifer</td><td>Grand fir</td><td>Lodgepole pine</td><td>Subalp zone</td></tr>
<tr><td>Snags > 20 in DBH (per acre)</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Green Tree Replacements (per acre)</td><td>16</td><td>16</td><td>9</td><td>14</td><td>19</td></tr>
<tr><td>Down Wood Pieces (per acre)</td><td>3 - 6</td><td colspan="2">15 - 20</td><td colspan="2">15 - 20</td></tr>
<tr><td>Diameter at the small end</td><td>≥ 12 inches</td><td colspan="2">≥ 12 inches</td><td colspan="2">≥ 8 inches</td></tr>
<tr><td>Length per piece</td><td>> 6 feet</td><td colspan="2">> 20 feet</td><td colspan="2">≥ 8 feet</td></tr>
<tr><td>Total length per acre</td><td>> 20 feet</td><td colspan="2">> 100 feet</td><td colspan="2">≥ 120 feet</td></tr>
</table></td><td>Prior to, during, and post activity</td></tr>
<tr><td>Maintain snags when burning</td><td>66. Slash will not be piled against large trees or snags to prevent loss from prescribed burning.</td><td>Prior to and during activity</td></tr>
<tr><td>Maintain snags for bat roosting</td><td>67. Hollow or partially hollow, broken top snags greater than 15 inches DBH will be left to provide roost habitat for bats. Dead grand fir most commonly provides hollow tree habitat.</td><td>Prior to and during activity</td></tr>
<tr><td>Protection of unique wildlife habitat</td><td>68. Unique wildlife habitat such as, seeps, springs, bogs, wallows, cliffs, talus, and caves will be protected by minimizing ground disturbance one and one half tree lengths from the area. (FP 4-57, 4-160)</td><td>Prior to and during activity</td></tr>
<tr><td>Protection of scab flats and meadows</td><td>69. Lithosol (scab flats) and meadows will not be used for landings and skid trails unless no other location is practical. If use is necessary disturbance will be kept to a minimum amount of the area, preferably at the edges.</td><td>Prior to and during</td></tr>
</table>

| Objective | Task | Time-line |
|---|---|---|
| | | activity |
| **Meet ESA requirements** | 70. If any federally listed species are found in the project area, the appropriate resource specialist will be contacted immediately. The Contracting Officer will take appropriate action to insure species are protected. Timber sale contract provision BT6.24 will apply. Protection measure for known federally listed species will be listed in provision BT6.24. | Prior to, and during activity |
| **Protection of Goshawk Habitat** | 71. Protect goshawk nests from disturbance if any are located during project activities. No nest sites are currently identified. Defer harvest on 30 acres of the most suitable nesting habitat around nest sites. Retain late and old structure forest in a 400-acre post-fledging area (PFA) as determined by the district biologist. Defer activities in active PFAs from April through August. (Forest Plan – Eastside Screens) | Prior to and during activity |
| **Protection of Raptor Nests** | 72. Protect known or discovered raptor nest sites from management and human disturbances until fledging has been completed. Level of protection will vary by species and will be recommended by the District wildlife biologist (FP 4-57, 4-160). | Prior to, and during activity |
| **RECREATION** | | |
| **Protection of recreational access** | 73. Ensure that roads are closed during logging and prescribed fire activities and are re-opened as soon as possible after work is completed, especially during hunting season. | Prior to and during activity |
| **Transportation management** | 74. During project activity alternative snowmobile routes will be designated in order to avoid conflict between winter logging operations and snowmobile activity. | Prior to and during activity |
| **Protection of dispersed camping sites** | 75. Areas around dispersed hunter camps will be retained with a Partial Retention Visual Quality Objective (VQO). | During, and post activity |
| **PUBLIC SAFETY** | | |
| **Public safety during project implementation** | 76. Warning or informational signs will be placed along major travel routes during project operations to alert and inform the public. Current information will be posted on portal entry kiosks.<br>77. Public access may be restricted in some areas during active haul of merchantable material for public and operational safety.<br>78. If treatment activities occur around an inventoried hunter camp, identified danger trees will be felled and removed. | Prior to and during activity |
| **FUELS AND PRESCRIBED FIRE** | | |

| Objective | Task | Time-line |
|---|---|---|
| **Protection of resources during fuels and prescribed fire activities** | 79. Hand piling of fuels in units where visual quality is a concern<br>80. Mop-up/suppression activities will be conducted for fires that cause mortality of trees at unacceptable levels within activity fuel units.<br>81. Fireline construction - blackline: Backlines are pre-burned areas that are used as firelines. Often times they are associated with natural barriers or roads using to widen the defensible area. Black lining can provide a wide fireline without the disturbance that occurs with other methods.<br>82. Handline: Hand firelines will be used only when burn conditions indicate the need to control the creep of fire in the duff. There is the potential that fall burning will require the use of more handlines than spring burning because of lower fuel moisture and the higher risk of fire creeping into unwanted areas. Burning will occur during times (season and time of day) of relatively higher humidity to reduce the need of handline in riparian. Chainsaws will be used to cut overhanging brush and large logs. Line construction will remove the duff the layer to mineral soil no more than 18 inches wide. Any line constructed will be rehabbed and water barred.<br>83. Ignition: The burning of piles and construction of blacklines will be done by hand ignition. No mixing or preparing of slash fuels will occur in the planning area. Slash fuel needed for hand ignitions will be mixed prior to reaching the area. | Prior to, during, and post activity |
| | **VEGETATION** | |
| **Protection from insects and disease** | 84. Treat grand fir and subalpine fir stumps with borax to reduce the risk of root disease spreading to remaining sites. | Post activity |
| **Protection of residual trees** | 85. Protect desirable advanced regeneration and mature trees in residual stands of all harvest and fuel treatment units. | During activity |
| | **TES PLANTS** | |
| **Protection of sensitive plant species** | 86. The population of mountain moonwort proximal (within 0.1 mile) to unit 49 will be designated as a ‘no activity zone’ during project implementation. The Forest Botanist will provide a map of the population location for contract avoidance of the area and will flag this site on the ground for avoidance prior to implementation. Trees will be felled away from the ‘no activity zone’; no staging of equipment and no ground disturbance will be allowed in this zone. | Prior to and during activity |

## Monitoring Framework

Monitoring for both implementation (whether the project was implemented as planned) and effectiveness (whether overall management objectives were met) would occur. Forest Service personnel would conduct monitoring in areas that have the highest probability of showing effects.

BMPs have been identified for the proposed action (Table 2-7 and Appendix D). Activities may be selected for implementation and effectiveness monitoring as part of the Forest-wide annual BMP monitoring program.

The Forest Service contract representative or other staff will monitor during and after activities to ensure sediment and soil disturbance objectives are met. If objectives are not met, Forest Service personnel would identify and implement corrective action and document modifications to be used in future projects.

The District noxious weed coordinator or crew would conduct noxious weed species surveys prior to initiation of harvest or other ground disturbing activities within the project area.

Forest Service personnel would spot-check activities during implementation to determine whether noxious weed mitigation measures are implemented. Deviations would be corrected immediately.

Dependent on available funding and resources, the District noxious weed coordinator or crew would inventory portions of the project area determined to be at risk for weed spread due to project implementation for up to five years as needed.

Anticipated effectiveness of each monitoring element for the Tollgate project is considered to be high.

## ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

The following alternatives were considered and eliminated from detailed study by the Responsible Official for reasons identified below:

### *Forest Health Treatments*

During project development the potential to merge general forest health objectives with fuel reduction objectives was considered. This alternative would have treated other stands within the project planning area which were not specifically identified as fuel reduction locations, but did have signs of concern from a forest health perspective (such as insect and disease).

This alternative was eliminated from detailed study based on IDT recommendation, based on current understanding that under HFRA, projects must focus specifically on stands identified as being strategic for fuels reduction needs. This approach would help focus the project goals and focus the analysis on stands and treatments directly related to fuels reduction work.

The Responsible Official accepted the IDTs recommendation and eliminated the alternative from detail study, while recognizing that some stands with forest health concerns would be treated in order to meet fuels reduction objectives. Additionally, the exclusion of such treatments as part of this project does not preclude the potential for a future project that focuses on forest health objectives.

### *Structure protection treatments only*

During public involvement it was suggested that treatments focus around structures only.

The suggestion was eliminated from being a stand alone alternative because the vegetation types in the area lend themselves to succeptibility for crown fire. Modelling showed that crown initiation in the project area would result in large spotting distances which would likely through fire brands and aerial spotting, resulting in secondary ignitions. Furthermore, most of the structures within the Tollgate WUI are privately owned.

Oregon Department of Forestry (ODF) has been working with local landowners throughout the Tollgate WUI for several years to help design projects and secure grant money to implement fire proofing activities on private properties.

Additionally, structure protection was incorporated into the proposed action because in conjunction with other larger shaded fuel breaks, the treatment would be more effective. Therefore acres around structures were factored into treatment locations.

### *Landscape Prescribed Fire*

This alternative would have called for the use of landscape prescribed fire to accomplish fuel reduction objectives within the Tollgate project planning area. The alternative was eliminated from detailed study because of the vegetation types within the Tollgate project as well as the close proximity of treatment areas to values of interest

Additionally, the time of year when landscape fire would be most effective is also the time of year that holds the greatest potential for wildfire. This would result in a high risk operation for alternative implementation should it have been selected.

Furthermore, landscape fire would likely prove ineffective or at least inefficient at limiting fuels at strategic “pinch points.” Fire managers determined that landscape fire, given these circumstances, was not proper for this project.

### *Non-Commercial Thinning Only*

Comments received during public scoping suggested that fuels reduction activities focus only on non-commercial methods be used to treat small diameter material. This alternative was eliminated because the removal of only non-commercial sized material would not account for larger material in the understory that would act as a fire ladder into the upper canopy.  Additionally, without reducing canopy bulk density the area would still be susceptible, to a large degree, to the ignition of a crown fire due to radiant heat which would push ahead of a potential fire as it moves up onto the plateau.

### *Development of large fuel breaks*

Early scoping comments suggested the development of large fuel breaks around the Tollgate plateau. These fuel breaks would be similar to dozer line and be more or less void of vegetation for a 100-300 foot swath. This alternative was eliminated because fire managers felt that a shaded fuel break would be effective, and would better allow for the continued various recreational and aesthetic qualities valued in the Tollgate area. The shaded fuel break would have alternating levels of intensity of treatment in various areas with some area have lighter prescriptions while others would have higher impacts.

### *Recreation area improvements*

During the collaborative process, a suggestion was brought forth that the project should include activities designed to increase recreation opportunities and/or improve existing opportunities within the Tollgate project planning area.

This alternative was eliminated from detailed study because recreational improvements are not an authorized action under the HFRA authorities and thus not appropriate for this project. The suggested recreational opportunities and ideas were noted and may help inform future recreation projects within the Tollgate area.

### *More Acres of Treatment within the Project Planning Area*

Some public comments expressed a desire for more acres to be treated within the project planning areas identified boundary. Comments pointed out that Forest Service is only proposing to treat approximately

10% of a 46,000 acre planning area and expressed a belief that this was not enough treatment across the landscape. These comments resulted in consideration of potentially increasing the footprint of proposed treatments.

The vast majority of acres within the planning area are not available for treatment for a number of different reasons, including other ownership, land allocation, previous treatments, Wilderness, and IRA.

Upon further consideration it was determined that this alternative would be eliminated from detailed study because the prescribed treatments (identified in the proposed action) were strategically placed to provide fuels treatments while also balancing other resource needs in the area. Furthermore, given the statement above, the addition of other acres more likely would deal with forest health type treatments which are discussed in item 1 above.

# CHAPTER 3 – AFFECTED ENVIRONMENT

# INTRODUCTION

This chapter describes past, present, and reasonably foreseeable actions as well as the affected environments of area resources.

# PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

The temporal and spatial scale of analysis is variable depending on the resource concern being evaluated, particularly when considering the effects of past, present, and reasonably foreseeable actions. During the interdisciplinary process the team followed guidance presented in CEQ's letter dated June 24, 2005 regarding past actions. Using this guidance the following summary of past, present, and reasonably foreseeable actions within and adjacent to Tollgate Fuels Reduction Project planning area was developed. These actions were considered, where relevant, when addressing the cumulative effects for various resources.

"Cumulative impact" (or effects) is defined in the CEQ regulations as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). The effects are disclosed in Chapter 4.

## Past Activities

Past actions include timber harvest. The residual effects of these activities are displayed on the landscape and contribute to the description of the current condition (affected environment). Past actions are maintained as a layer in the District's GIS database and they are used to calculate Equivalent Treatment Acres for watershed conditions, elk habitat effectiveness index (HEI), and cover values for big game, historical range of variability (HRV), and soil conditions. Table 3-1 describes brief summaries of past actions that occurred in the project planning area:

**Table 3-1 — Timber Harvest by decade**

| Years | Acres | Silviculture Prescriptions |
|---|---|---|
| 1955-1959 | 420 | Sanitation (salvage) |
| | 32 | Stand Clearcut |
| | 7 | Patch Clearcut |
| | 156 | Partial Removal |
| | 25 | Shelterwood Establishment Cut |
| | 16 | Strip Clearcutting |
| 1960-1969 | 620 | Salvage Cut |
| | 306 | Shelterwood Removal Cut |
| | 1,449 | Commercial Thin |
| | 1274 | Sanitation (salvage) |
| | 363 | Stand Clearcut |
| | 31 | Seed-tree Seed Cut |
| | 76 | Single-tree Selection Cut |
| | 378 | Shelterwood Establishment Cut |
| | 91 | Patch Clearcut |
| | 30 | Group Selection Cut |
| | 203 | Strip Clearcutting |
| 1970-1979 | 382 | Stand Clearcut |

| Years | Acres | Silviculture Prescriptions |
|---|---|---|
| | 229 | Sanitation (salvage) |
| | 1807 | Commercial Thin |
| | 189 | Shelterwood Establishment Cut |
| | 203 | Strip clearcutting |
| | 310 | Single-tree Selection Cut |
| | 120 | Seed-tree Seed Cut |
| | 52 | Group Selection Cut |
| 1980-1989 | 2160 | Sanitation (salvage) |
| | 1168 | Stand Clearcut |
| | 3 | Overstory Removal Cut |
| | 1166 | Stand Clearcut |
| | 229 | Group Selection Cut |
| | 411 | Shelterwood Removal Cut |
| | 2154 | Commercial Thin |
| | 38 | Salvage Cut |
| | 250 | Shelterwood Establishment Cut |
| | 5 | Patch Clearcut |
| 1990-1999 | 2735 | Commercial Thin |
| | 2070 | Sanitation (Salvage) |
| | 1595 | Stand Clearcut |
| | 33 | Seed-tree Seed Cut |
| | 147 | Shelterwood Establishment Cut |
| | 15 | Salvage Cut |
| | 123 | Shelterwood |
| | 73 | Single-tree Selection Cut |
| | 802 | Patch Clearcut |
| | 38 | Group Selection Cut |
| 2000-Present (last entry 2008) | 637 | Sanitation (salvage) |
| | 1886 | Salvage Cut |
| | 6 | Group Selection Cut |
| | 82 | Stand Clearcut |
| | 19 | Overstory Removal Cut |

## Wildfire

Historical fire information dating back to the 1800s includes two (2) fires greater than 5,000 acres that burned large portions of the Tollgate plateau. One fire occurred prior to 1900 and the other in 1910. Additionally, three (3) other fires ranging in size between 300 and 1,000 acres occurred on the plateau between the 1800s and 1910. From the 1990's to the present, approximately 63 wildland fires occurred within the project planning area. More recently the Burnt Cabin Fire (2005) burned approximately 2,000 acres and threatened the plateau. As a result of these ignitions, fire suppression tactics were employed across the landscape. These tactics include, but are not limited to; fireline construction, vegetation removal, water drafting, and aerial applications of fire retardant.

## Roads

There are approximately 156 miles of roads within the project planning area. Roads have been constructed throughout the planning area. The construction of these roads and their maintenance over time has resulted in the removal of vegetation for the initial construction of the travel way. Additionally, future maintenance activities continued the pattern of vegetation removal along travel corridors.

### *Grazing*

The North End Sheep and Goat Allotment partially occurs within the planning area.. Domestic sheep and goat grazing has occurred within the planning area since the late 1800s. The allotment covers 132,000 acres.

### *Recreation*

The Tollgate area is home to several Forest Service campgrounds and trailheads. Additionally, downhill skiing has occurred in the area since the 1930s. The Spout Springs Ski Area was previously known as the Lookingglass Ski Bowl. Cross-country skiing is a frequent activity in the area as is hunting, hiking, OHV use, mountain biking and other aesthetic recreational uses.

### *Wilderness Establishment*

In 1984, Congress established the North Fork Umatilla Wilderness. Portions of the North Fork Umatilla is within the Tollgate project planning area and covers two counties in Oregon. The establishment of the wilderness resulted in the 20,144 acres being left to natural processes which includes vegetation growth and fuels accumulation over time.

### *Development of Adjacent Private Property*

As with much of the nation, privately owned property is continuing to be developed by landowners for a myriad of uses including residential development, recreational development, and harvest of private forest lands. These development activities continue to result in expansion of the wildland-urban interface (WUI).

### *Non-Commercial Thinning*

Approximately 1558 acres of non-commercial thinning has occurred within the project planning area since 1990.

## Present (ongoing) Activities

### *Recreation*

Ongoing use of dispersed camping, hunting, sightseeing that occurs year-round. Public firewood gathering and snowmobile use are expected to continue to occur. Continued use of Spout Springs Ski Area is expected to occur along within other winter recreation activities. Established campsites within the project planning area will continue to be used by the public as will trailheads.

### *Grazing: North End Sheep & Goat Allotment*

Grazing activities will continue into the future within the allotment which covers portions of the Tollgate project planning area.

### *Road Maintenance*

Roads within the project planning area are maintained in order to provide for user safety and to alleviate the potential for road related effects to other resources. Road maintenance activities include but are not limited to, blading, surface rock replacement, brushing, removal of vegetation from roadway, removal of dangers from roadside and winter snow plowing.

### Special Forest Products Gathering

Personal and Commercial use gathering of firewood, mushrooms, post and poles, and other products is ongoing throughout the planning area.

### Communication Site Operations

The communications site, which is operated under special use permit(s) within the footprint of the Spout Springs complex, will continue to have maintenance activities associated with its proper function by the various permittees which operate within the site.

### Wilderness Management

Ongoing management of wilderness, in accordance, with Wilderness standards will continue into the foreseeable future.

### Development of Adjacent Private Property

As with much of the nation, privately owned property is continuing to be developed by landowners for a myriad of uses including residential development, recreational development, and harvest of private forest lands. These development activities continue to result in expansion of the wildland-urban interface (WUI).

## Reasonably Foreseeable Future Activities

Actions are considered ‘reasonably foreseeable’ if there has been any public notice or planning regarding an activity, or if future activity can be projected based on ongoing or historical activity in the area with enough specificity to analyze effects. In general, reasonably foreseeable projects are expected to prior to approximately 2020.

### Non-Commercial Thinning

No acres are proposed for non-commercial thinning.

### Grazing

North End Sheep & Goat Allotment- Grazing activities will continue into the future within the allotment which covers portions of the Tollgate project planning area.

### Road Maintenance

Roads within the project planning area are maintained in order to provide for user safety and to alleviate the potential for road related effects to other resources. Road maintenance activities include but are not limited to, blading, surface rock replacement, brushing, removal of vegetation from roadway, removal of dangers from roadside and winter snow plowing.

### Recreation

Ongoing use of dispersed camping, hunting, sightseeing that occurs year-round. Public firewood gathering and snowmobile use will continue to occur. Continued use of Spout Springs Ski Area will occur along within other winter recreation activities. Established campsites within the project planning area will continue to be used by the public as will trailheads.

### *Communication Site Operation*

The communications site, which is operated under special use permit(s) within the footprint of the Spout Springs complex, will continue to have maintenance activities associated with its proper function by the various permittees which operate within the site.

### *Wilderness Management*

Ongoing management of wilderness, in accordance, with Wilderness standards will continue into the foreseeable future.

### *Swamp Creek Commercial Thin*

This activity is scheduled to occur within the footprint of the Tollgate project. It is several Tollgate units. This project calls for commercial thinning within a 1960s era plantation. The project is targeted at improving stand condition within the 51 acre unit.

# SOILS

## Scale of Analysis

The scale of analysis for soils resources is primarily the areas proposed for actions- typically referred to as activity units- where ground-disturbing operations would occur. Associated system roads and temporary roads are included in assessments. Ecological setting refers to the entire analysis area.

Project mitigations and design criteria have been proposed to assure current Forest Plan standards and guidelines of minimizing detrimental soil conditions to less than 20 percent of the activity area would be met (See Chapter 2,Table 2-7).

Soils outside the proposed project are not expected to be directly affected by the proposed action with the exception of the use of forest service and county roads. Roads used for hauling commercial material would be maintained before and/or after haul.

## Affected Environment

GIS records indicate that each of the proposed activity units within the Tollgate Project Planning Area (Appendix A, Maps A1 and A2) has had some amount historic ground based commercial and non-commercial timber harvest activities. The exception to this is proposed unit 33 where timber was group selection cut and yarded by skyline. Most of the proposed units have had up to 3 to 5 entries, with several proposed having up to 6 entries between the years 1959 through 2004. Units 12, 41, 42 and 85, have had just one historic harvest activity. Although, multiple historic entries did occur in the same proposed unit, they may or may not have overlapped each other. The type, extent and intensity of harvest, and the associated soil impacts are variable, and tend to be related to the date implemented. The majority of stand clear cut, patch clear cut and group selection clear cut activities generally took place from 1959 to the late 1960’s. Selection-type harvests where individual trees or groups of trees were chosen and removed (commercial thin, sanitation/salvage, single tree selection), and shelterwood and seed tree cut activities tended to occur post 1970’s.

Field visits to conduct Level I soil surveys to assess existing detrimental soil conditions (DSCs) of proposed activity units occurred in the summer and fall of 2009. Surveys indicated that scattered skid trail systems are still evident in many of the stands. As indicated in Table 3-2, historic DSCs are generally low and tend to be limited to 0 to less than 6 percent of any one activity unit. Survey results indicated that proposed activity units 1, 3, 5, 25, 36, 70, 73, 76, 77 have moderate to high amounts of DSCs (ranging from approximate 8 to 23 percent). Only proposed unit 3 currently exceeds Forest Service guidelines with the amount of DSC estimated at 23 percent of the unit area. Total amount of DSC for each unit is assumed to include the percent DSCs from existing roads. Table E-1 in Appendix E lists the total existing detrimental soil conditions (Classes 2 and 3), non-detrimental soil impacts (Classes 0 and 1) and site specific comments for each proposed activity unit. To limit further DSC in proposed units; designating skid trails may be the most economical means to maintain site productivity (Froehlich and. McNab 1983).

**Table 3-2 — Existing Detrimental Soil Condition, Proposed Units**

| UNIT[1,2] | DESCRIPTIVE EXISTING DISTURBANCE LEVEL[3] | DETRIMENTAL SOIL CONDITION (DSC) % | TOTAL ACRES DSC |
|---|---|---|---|
| 4, 9, 12, 15, 19, 20, 21, 23, 26, 27, 29, 32, 33, 34, 35, 37, 38, 41, 42, 43, 44, 45, 48, 49, 50, 51, 53, 54, 55, 62, 69, 71, 72, 75, 78, 79, 81, 82, 83, 85, 86, 87, 89, 94, 95, 96, 97, 98, 99, 100, 102, 105 | Low | 0% | 0 |
| 1, 5, 10, 18, 31, 36, 46, 47, 52, 56, 61, 64, 66, 67, 68, 70, 76, 84, 90, 101, 103, 104 | Low | 2-10% | 63 |
| 25, 36, 73, 77, | Moderate to High | 10-20% | 19 |
| 3 | High | >20 (23%) | 4 |
| **Total Acres DSC's** | | | **86** |

Units 31, 67, 104 and 105 were either not surveyed or had incomplete survey data. The amount of DSC's was extrapolated from data available for proposed units adjacent to these units without data. Surveys for proposed units surrounding unit 67 indicated a range of 0-5% DSC's. The value of 5% was used to reduce the margin of error for in estimating DSC for unit 67. Unit 31 has had a minimum of 7 historic harvest activities within its boundaries (including stand and patch clear cuts). Surveyed units surrounding unit 31 indicated 0% DSC's. However, a value of 5% was given to unit 31 to account for the high amount of historic activities in that unit. Unit 81 boundaries were re-drawn to include a portion of unit 36 with harvestable trees. This was done after soil condition surveys were conducted in 2009. Survey data indicated 0% DSC's for unit 81, and 8% DSC's for unit 31. DSC % for 81 was adjusted to 5% to account this boundary change.

[3]The descriptors (Low, Moderate and High) are based on terms as used in the "Umatilla NF Protocol for Assessment and Management of Soil Quality Conditions" (USDA FS, 2002). Descriptions are based on field observation and data assessments by District personnel and the Forest Soil Scientist.

The Class 2 DSCs are areas with rut depth greater than 6 inches, and are generally associated with old skid trails and landings. Surveyed areas with Class 2 DSC tend to be well-vegetated and stable with recovering surface duff layers and understory vegetation. A few skid trails, two-track roads and FS system roads showed evidence of minor erosion (units, 42, 52, 100). No chronic erosion or other problems were observed. To reduce the amount of new detrimental soil impacts it is recommended to maximize use of existing skid trails, haul roads, and landings. Roads used for hauling commercial material would be maintained before and/or after haul. Maintenance would include grading road surfaces, cleaning culverts and brushing. There may be opportunity to reduce the amount of historic detrimental soil conditions by subsoiling to fracture compacted soil layers, improve infiltration of water, and accelerate the physical processes that break down soil compaction.

Class 1 soil conditions are described as rutting depth less than 6 inches and considered to be non-detrimental. Survey results indicated moderate to high amounts of legacy, class 1 soil impacts from historic harvest activities in most proposed activity units. The amount of class 1 soil impacts generally ranged from 0 to 59% of the unit area (average range was 10 to 25%). The highest amount of class 1 soil impacts was observed in units 34, 36, 73, 77 (ranging from 40 to 59%). Units with high amounts of Class 2 soil damage tend to correspond with greater than 8 % class 2 DSCs. Survey results for units 6, 38, 44, 57, 58, 61, 66, 67, 85, 89 indicated less than 5% Class 1 soil impacts. Units with low amounts of Class 1 soil damage tend to correspond with less than 5% class 2 DSCs. Level 1 soils survey does not measure soil bulk density or require a shovel test to qualitatively describe soil structure that may benefit from subsoiling.

# HYDROLOGY

Treatment alternatives were evaluated based on their effect to hydrologic function and condition, water quality, and water yield. Indicators used to analyze effects of proposed actions are described in Chapter 1, Table 1-3.

## Geographic scale of analysis

The hydrologic system and the hydrologic effects of proposed actions were analyzed for National Forest System (NFS) lands by Hydrologic Unit Code (HUC) 6 Subwatershed (SWS). Cumulative effect indicators including Equivalent Treatment Acres (ETA) are reported by HUC 6 SWS. Subwatersheds that include proposed activities will be referred to as the Tollgate Project Planning Area.

The mapped project boundary includes parts of five subwatersheds (Hydrologic Unit Code 6$^{th}$ fields) (Figure 3-1):

1. Little Lookingglass Creek(HUC 170601041002),
2. Upper Lookingglass Creek (HUC 170601041001),
3. Middle South Fork Walla Walla River (HUC 170701020102),
4. North Fork Umatilla River(HUC 170701030104), and

5. Bear Creek – which includes the mainstem Umatilla River downstream of the Forth Fork of the Umatilla River (HUC 170701030106).

## Temporal scale of analysis

Cumulative effects for water quality will be analyzed for short term 1 day to 1 week and for long term, up to one runoff season. These time scales were chosen to display short term concentrated effects, and longer term seasonal effects that are sometimes seen during spring runoff.

Cumulative effects for water yield are estimated using records of timber harvest activity dating to the 1960s. The Equivalent Treatment Acre (ETA) model has a 33 year time-frame for the slowest sites to recover hydrologically (collection, storage, and release of precipitation). Although vegetation management proposed in the project may occur over a number of years, the calculation is done as if it all occurs in 1 year, and therefore shows the maximum effect that could be expected. Hydrology and Topography Overview

Tollgate Project Planning Area has a mixed maritime-continental climate with seasonal extremes of temperature and precipitation. Most precipitation comes as winter rain or snow between November and May. Annual precipitation increases with elevation from lows of 32-36” in the major western drainages of the analysis area; North Fork Umatilla and South Fork Walla Walla River. Highest precipitation amounts, 52-56”, per year are found on ridges from Horseshoe Prairie in the south through Bald Mountain in the center of the analysis area and above Mottet Creek in the northeastern corner of the analysis area. Flow is generally dominated by snowmelt with peaks in the spring and low flow in August and September. Regional rain-on-snow events in 1964 and 1996 caused large scale flooding.

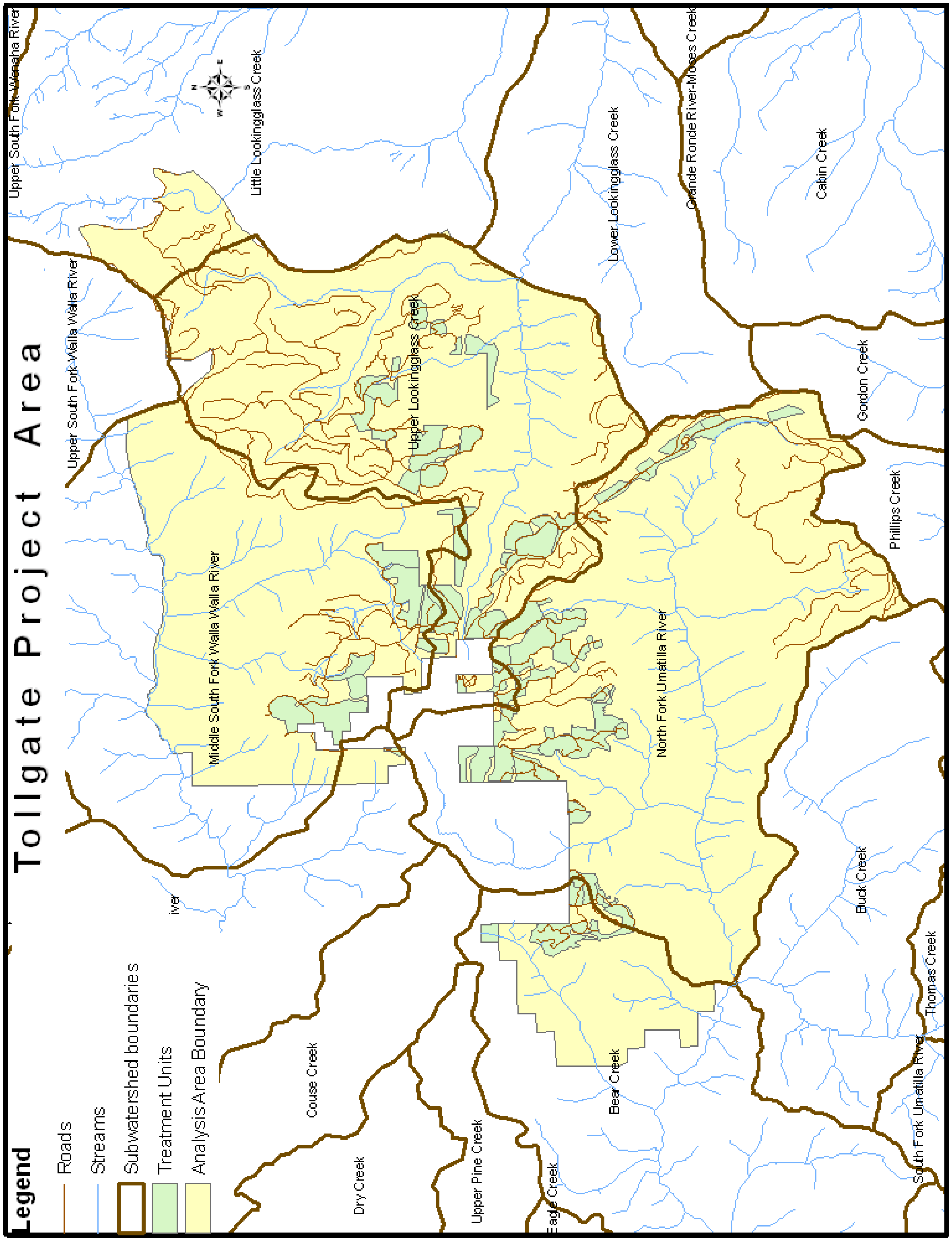


**Figure 3-1— Project area subwatersheds**

## *Hydrologic Function*

### RHCA Condition

The Umatilla NF Land and Resource Management Plan was amended by PACFISH in the mid-1990s. Prior to that time timber harvest units often extended to the creek bottoms. Harvest history information and geographic information system (GIS) stream layers were used to estimate RHCA harvest for the analysis area. From the mid-1960s to the implementation of PACFISH about 8% of the linear distance of RHCAs had harvest entries.

Miles of road inside RHCAs relative to miles of streams is very low in the analysis area (Table 3-3) reflecting the plateau-canyon topography of the area. The RHCAs of the analysis area are largely intact and subject to natural disturbance factors; insect and disease, flood, fire.

### Roads

Road density is used as an indicator of potential for affects to hydrologic function (extension of the stream network) and water quality (sediment delivery to surface waters). Road density is high in the Upper Lookingglass Creek SWS, reflecting past harvest history and is low in the other SWS of the analysis area (Table 3-3).

Stream crossings are used as an indicator of the degree of connectivity between the road system and the drainage network. To the degree that roads are connected to the drainage network the risk of road sediments reaching surface waters is increased, the drainage network is lengthened and the potential for precipitation to drain more quickly, with less residence time in the watershed is increased.

Stream crossings and road locations inside RHCAs are relatively low within the analysis area due to topography (Table 3-3).

The road systems on McDougal and Coyote Ridge, west of State Highway 204 have several areas of wet soils and seeps in and near roads. Approximately 0.35 miles of FR 3718155 is inside the RHCA of a perennial non-fishbearing stream and has a native surface (soil). The road is adjacent to a spring and the roadbed is saturated for much of the year in that location. Private landowners continue to use the road, resulting in extensive road surface rutting (Figure 3-2), and maintenance activities have pushed sediment into the spring.


**Figure 3-2 — FR 3718155 - Rutting**

Several culverts and roads have damage causing erosion and sedimentation and increased risk to surface waters. These areas are identified below:

- FR3715030 the culvert feeds a pond used by the North End Sheep Allotment and has caused a hole in the road
- FR3700040 culvert below the snowmobile trail is more than half filled with sediment
- FR 6400100 where a culvert on a perennial stream has washed out.
- An old and abandoned road below Unit 75 crosses the creek at the east side of the unit. The culvert is plugged and water is eroding the road bed.

**Table 3-3— Road Density and Road Stream Interaction on NFS Lands**

| Subwatershed | SWS Name | Road Density Open & Closed miles per square mile | Road Miles w/in RHCAs | Miles of road per mile of Stream | Stream & Road Intersections |
|---|---|---|---|---|---|
| 170601041001 | Upper Lookingglass Creek | 3.6 | 3.7 | .06 | 36 (class 3 & 4) |
| 170701020102 | Middle South Fork Walla Walla River | 1.0 | 2 | .02 | 25 (class 3 & 4) |
| 170701030104 | North Fork Umatilla River | 1.6 | 2.8 | .03 | 4 (fish)<br>25 (class 3 & 4) |
| 170701030106 | Bear Creek | 0.5 | 1.2 | .02 | 5 (fish mainstem)<br>5 (class 4) |

## *Water quality*

### Water temperature

Topography of the analysis area is characterized by uplifted basalt plateaus and deeply dissected canyons with steep side slopes. The headwaters of the streams of the analysis area are in the low gradient upland plateau and flow to the Grande Ronde River, the Umatilla River, and the Walla Walla River through steep canyons. The high gradient portions of these streams are generally inaccessible and have received little or no management disturbance. Fish are present in lower reaches of these streams near confluences with the larger creek and river systems. The NFS program of stream survey for aquatic habitat has evaluated most of these areas. Evaluation of several instream habitat and channel condition parameters may be found in the Biological Evaluation and Specialist's Report prepared for this project by District fish biologist David Crabtree.

Water temperature data has been collected for many years on streams in three (3) of the subwatersheds of the analysis area (Table 3-4). No water temperature data has been collected on Bear Creek. Water temperatures leaving the analysis area are generally cool. Past harvests occurring within RHCAs may have resulted in increases of stream temperature, but the extent to which this is the case is unclear. Ultimately, the cumulative effects of past vegetation management activities are reflected in existing temperature patterns.

**Table 3-4 — Water Temperatures Records for affected waterways**

| Location | 10 year average of 7-day Max Ave Water Temps |
|---|---|
| Lookingglass above the springs | 60˚ F |
| Lookingglass below the springs | 52˚ F |
| North Fork Umatilla River | 59˚ F |
| South Fork Walla Walla River | 54˚ F |

Lookingglass Creek has a somewhat unusual temperature regime in that in midsummer, downstream reaches (downstream of Lost Creek) average six to ten degrees Fahrenheit cooler than the upstream reaches. This is because several very large springs between the mouths of Lost and Summer Creeks account for the majority of the flow below Lost Creek. In nineteen years of monitoring at a point about two miles downstream of these springs, the stream temperature has never been recorded above 53 degrees Fahrenheit (7-day moving average max - Table 3-5). At the site of the springs, maximum water temperature was recorded as 46 °F consistently over a period of three years.

**Table 3-5 — 7-day Moving Average Water Temperatures in Streams in Tollgate Fuels Reduction Project Area**

| *Year* | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Upper Lookingglass Creek, above springs** | | | | | | | | | | | | | | | | | | | |
| **°F** | | 57 | 62 | | | | | | | | 62 | 63 | 60 | | | 62 | 57 | 61 | 59 |
| **Lookingglass Creek above Eagle Creek** | | | | | | | | | | | | | | | | | | | |
| **°F** | 53 | 51 | 52 | 53 | 52 | 51 | 52 | 53 | 52 | 52 | 53 | 52 | 52 | 52 | 53 | 52 | 51 | 52 | 52 |
| **South Fork Walla Walla River at the National Forest Boundary** | | | | | | | | | | | | | | | | | | | |
| **°F** | | | | 54 | 54 | 53 | 55 | 53 | 50 | 52 | 55 | 55 | 54 | 54 | 56 | 55 | | | |
| **North Fork Umatilla River near mouth** | | | | | | | | | | | | | | | | | | | |
| **°F** | 60 | 58 | 59 | 57 | 59 | 60 | | 58 | 59 | 59 | 59 | 59 | 59 | 59 | 60 | 59 | 57 | 59 | 57 |
| **Umatilla River at Corporation Guard Station** | | | | | | | | | | | | | | | | | | | |
| **°F** | 65 | 63 | 63 | 64 | 63 | 64 | | 64 | 64 | 64 | 65 | 65 | 64 | 64 | | 65 | 61 | 64 | 62 |
| **South Fork Umatilla above Buck Creek** | | | | | | | | | | | | | | | | | | | |
| **°F** | 69 | 68 | 70 | 66 | 67 | 67 | 69 | 66 | 67 | 68 | 67 | 68 | 68 | 68 | 68 | 70 | 63 | 69 | 68 |

The South Fork of the Walla Walla River is also a very cool stream. In 13 years of monitoring at the National Forest boundary, the highest temperature recorded (7-day moving average max) has been 55 degrees Fahrenheit. The North Fork of the Umatilla River is somewhat warmer, with the highest temperature on record (7-day moving average max) being 60 degrees Fahrenheit at the mouth on the South Fork of the Umatilla River. Temperature recording stations on both the North Fork of the Umatilla River and the South Fork of the Walla Walla River are at 2400 feet of elevation, however the recording site on Lookingglass Creek is at 3060 feet, so it has both the springs and elevation favoring cooler temperatures. The North Fork Umatilla would be expected to be cooler farther upstream, while for Lookingglass that principle would hold only to about a half-mile above Summer Creek.

The Bear Creek watershed contains about 11 miles of the Mainstem Umatilla River. It includes a number of very small, mostly intermittent tributary streams. Bear Creek is the largest of these tributary streams, but is tiny (<1 CFS on August 17, 2011, DMC, pers. obs.) in comparison to the flow of the Umatilla at the confluence. There are no temperature records available for Bear Creek. Out of 17 years of record, water temperatures in the Mainstem Umatilla in this subwatershed were consistently too high to meet the NMFS criteria for properly functioning, but met criteria for functioning at risk in all but three years, and averaged over all that time, the summer maximum temperature was 63.8° F.

#### Sediment

Existing conditions with respect to sediment are described above in the roads section. Additionally, timber harvest and road construction in the analysis area has been limited to upland locations due to topography, with minor exceptions within RHCAs as described above. Most road miles in the planning area are not connected to the hydrologic system, that is, they do not cross channels and runoff from them does not enter surface waters. Roads which are hydrologically connected are a risk to water quality. Roads inside RHCAs and with culvert problems are the most likely to contribute sediment to surface waters currently. The ability of these streams to move sediment far downstream is limited by low flow volumes and by channel roughness which traps sediment. To an uncertain degree, sediment levels in the analysis area are likely elevated over pre-management due to the existing road system, harvest history, and other actions.

### *Water Yield*

The relationship between created openings in forested landscapes and changes in water yield and peak flows has been documented by numerous studies. Changes in these parameters would be of concern for aquatic habitat and biota, downstream water users, and for channel morphology. Recent reviews of literature demonstrate that the relationship is highly variable (Stednick 1995, and Scherer 2001). Generally effects are not seen below 15-20 percent equivalent clearcut or treatment acres (ECA or ETA) and in a local study; effects were not seen below 50 percent ECA (Helvey 1995). Grant et al. (2008) suggests that increased peak flows could occur at ≥ 20% "ECA" and that the potential for effects to channel morphology is in the 5-10 year recurrence interval flow ranges. Umatilla National Forest Equivalent Treatment Area (ETA) model (Ager and Clifton 2005) was used to evaluate the cumulative effects of harvest through time in this analysis area and to see what change the proposed alternatives would make to this indicator (Table 3-6).

**Table 3-6 — Equivalent Treatment Area Percentages in 2011**

| Subwatershed[8] | | Existing Condition |
|---|---|---|
| **LOOKINGGLASS CREEK WATERSHED** | | |
| **170601041001** | Upper Lookingglass Creek | 2.0% |
| **UPPER WALLA WALLA RIVER WATERSHED** | | |
| **170701020102** | Middle South Fork Walla Walla River | 0.5%<br>10.5%[9] |
| **UPPER UMATILLA RIVER WATERSHED** | | |
| **170701030104** | North Fork Umatilla River | 1.3% |
| **170701030106** | Bear Creek | 0.5% |

## Clean Water Act

Congress has designated the State of Oregon as having responsibility to implement the Clean Water Act (CWA). The Clean Water Act requires that water quality standards be developed to protect beneficial uses and a list be developed of water quality impaired streams (303d list). When water quality standards are not met the CWA further requires development of Total Maximum Daily Loads (TMDL) for the pollutants; calculated pollutant amounts that a water body can receive and still meet Oregon water quality standards. Water Quality Management Plans (WQMPs) are developed during the TMDL process to identify measures to improve water quality.

Oregon Department of Environmental Quality (ODEQ) has identified Use Designations and has recently revised its water quality standards based on life stages of fishes. Tollgate Fuels Reduction Project is located in three subbasins; Upper Grande Ronde, Walla Walla, and Umatilla. Beneficial use designations and water quality standards can be found in the Oregon Administrative Rules (OAR). Categories of Beneficial Uses are described below in Table 3-7.

| | |
|---|---|
| Grande Ronde Basin | OAR 340-41-151 tables and maps |
| Umatilla Basin | OAR 340-41-310 tables and maps |
| Walla Walla Basin | OAR 340-41-330 tables and maps |

8 Data limitations prevent modeling all subwatersheds within the three (3) watersheds affected by the Tollgate project. All subwatersheds (SWS), including those not modeled have ETA percentages substantially lower than 15%.

9 Includes estimated conifer mortality caused by the Burnt Cabin Fire (2005) located in the Middle South Fork Walla Walla Subwatershed.

The Tollgate Fuels Reduction Project proposes hauling logs on roads that cross and drain to surface waters and potential exists for stormwater discharges from those roads. There is existing uncertainty regarding whether a Clean Water Act National Pollution Discharge Elimination System (NPDES) permit may be required for stormwater discharges from logging roads. This uncertainty arises from a recent court decision in the Ninth Circuit Court of Appeals and its application to the Forest Service by the Federal District Court for the District of Montana.

During scoping for the Tollgate project, comments were solicited from the appropriate Federal, State, or local agencies that are authorized to develop and enforce environmental standards these agencies are described in Chapter 5 of this document. Specifically, since the proposed project would involve hauling logs over roads, and there potentially could be stormwater discharges from those roads, the Forest Service invited comments from, and consulted with the Environmental Protection Agency—the agency in the state of Oregon (where the Tollgate project occurs) that issues NPDES permits.

**Table 3-7 — Categories of Beneficial Uses for Streams within the Grande Ronde, Walla Walla, and Umatilla Subbasins**

| | |
|---|---|
| Aquatic Life Uses | bull trout, salmon and trout spawning and rearing, migration |
| Recreation Uses | Fishing, Boating, Water Contact Recreation |
| Water Supply Uses | Domestic, Industrial, and Agricultural |
| Miscellaneous Uses | Wildlife & Hunting, Hydro Power, Aesthetic Quality |

**http://www.deq.state.or.us/wq/standards/uses.htm**

## *Water Quality Standards*

Water Temperature standards are based on life stages of fishes and measured with 7-day-average maximums. In the Tollgate Project Planning Area the following standards apply.

- Lookingglass Creek, South Fork Walla Walla River, North Fork Umatilla River, and Bear Creek: Bull trout spawning and juvenile rearing; may not exceed 12.0 degrees Celsius (53.6 degrees Fahrenheit).
- Natural Conditions Criteria; where the department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body.
- Narrative sedimentation standard; the formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed

Water Quality Standards may be found at the following site which is the property of and maintained by the State of Oregon: http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_041.html

### *Total Maximum Daily Load*

The State of Oregon has completed TMDLs for the Upper Grande Ronde River Subbasin (May 2000), the Umatilla River Subbasin (May 2001), and the Walla Walla Subbasin (September 2005). EPA approval of these TMDLs moved water temperature and sediment impairments off of Category 5 lists to other categories.

Some new listings have occurred since then. The most recent water quality assessment in Oregon was made in 2004/2006 (State of Oregon, Oregon Department of Environmental Quality, Water Quality Assessment and 303(d) List, 2006).

Current 303d listed water quality impairments may be found at:
**http://www.deq.state.or.us/wq/assessment/rpt0406/search.asp**

### *Water Quality Management Plans*

Water Quality Management Plans (WQMP) covering US Forest Service lands are in place in the Upper Grande Ronde Sub-Basin and the Umatilla River Basin. The WQMP for the Walla Walla Subbasin is in draft.

Forestry WQMPs rely on current laws, management plans, and Best Management Practices (BMPs) to provide the basis for improving water quality in the forested landscape. All federal land management activities must follow standards and guidelines (S&Gs) found in the Umatilla National Forest Plan, as amended by Pacfish (USDA and USDI 1995), and BMPs as defined in the Implementation Plan for 208 (Water Pollution Control Act, PL 92-500, as amended). Pacfish provides management direction in the form of interim Riparian Habitat Conservation Areas (RHCAs) and Standards and Guides for Key Watersheds.

WQMPs for these basins expect current policies, regulations, BMPs, and adaptive management techniques to minimize unwanted pollutants from forestry related activities. Habitat conditions are expected to be improved through implementation of BMPs developed for the temperature TMDLs which promote riparian conditions that improve channel stability and reduce erosion and promote the protection and recovery of channel morphology to the most stable forms.

The Forest Service's responsibilities under the Clean Water Act are defined in a Memorandum of Understanding between Oregon Department of Environmental Quality and the Forest Service completed in 2002 and updated in 2007 (USDA and ODEQ 2007). The MOU designates the Forest Service as the management agency responsible for meeting the Clean Water Act on NFS lands and recognizes best management practices (BMPs) as the primary mechanism to control nonpoint source pollution on NFS lands. There is further recognition that BMPs are developed by the Forest Service as part of the planning process and includes a commitment by the US Forest Service to meet or exceed standards.

## FISHERIES

### *Geographic Boundary*

The geographic boundary of analysis for fisheries resources potentially affected by the activities included in the Tollgate project is identical to that for water resources described in the hydrology section above. Streams in or near the Tollgate planning area are described in **Error! Reference source not found.**. Tollgate Project Planning Area has a mixed maritime-continental climate with seasonal extremes of temperature and precipitation. Most precipitation comes as winter rain or snow between November and May. Annual precipitation increases with elevation from lows of 32-36" in the major western drainages of the analysis area; North Fork Umatilla and South Fork Walla Walla River. Highest precipitation amounts, 52-56", per year are found on ridges from Horseshoe Prairie in the south through Bald Mountain in the center of the analysis area and above Mottet Creek in the northeastern corner of the analysis area. Flow is generally dominated by snowmelt with peaks in the spring and low flow in August and September. Regional rain-on-snow events in 1964 and 1996 caused large scale flooding.

Topography of the analysis area is characterized by uplifted basalt plateaus and deeply dissected canyons with steep side slopes. The headwaters of the streams of the analysis area are in the low gradient upland plateau and flow to the Grande Ronde River, the Umatilla River, and the Walla Walla River through steep canyons. The high gradient portions of these streams are generally inaccessible and have received little or no management disturbance. Fish are present in lower reaches of these streams near confluences with the larger creek and river systems. The NFS program of stream survey for aquatic habitat has evaluated most of these areas. Evaluation of several instream habitat and channel condition parameters may be found in the Biological Evaluation and Specialist's Report prepared for this project by District fish biologist David Crabtree.

Although the project analysis area boundary includes part of the Little Lookingglass subwatershed, Activity units originally proposed in the Little Lookingglass subwatershed have been dropped from the project. Since no activities are proposed for that part of the analysis area, there would be no reason to evaluate baseline conditions or project effects in the Little Lookingglass subwatershed. Additionally there is a tiny amount of activity proposed for the Lower South Fork Walla Walla subwatershed (HUC 170701020103), but that work would be right on the ridge top, is a very small area (<10 acres), distant from all stream channels, and has no potential to produce any affect to any fish or aquatic habitat, so it will also be excluded from further analysis.

Since there is no potential for effects to fish or their habitat in either the Little Lookingglass or the Lower South Fork Walla Walla subwatersheds, neither would there be any possibility of contribution to cumulative effects there, so these subwatersheds will be excluded from the cumulative effects analysis as well.

As is explained in more detail later in this document, effects of project activities to aquatic habitat, if any, would be limited to small, non-fish bearing, headwater streams, and are very unlikely to be detectable in fish habitat at all, and certainly would not be detectable beyond the point where fish bearing streams exit the project area subwatersheds. Therefore the physical boundaries for the cumulative effects component of this analysis will be the boundaries of those three subwatersheds with substantial amounts of project activities; Upper Lookingglass Creek, North Fork Umatilla River, and Bear Creek.

### *Temporal Boundary*

Since the Tollgate Fuels Reduction project includes a timber sale component, the time scale of the analysis would include the time to complete the timber sale harvest plus the time needed to complete treatment of the fuels (slash) created by the timber sale (activity fuels) plus the time for recovery from effects to soils or other affected resources. Timber sales contracts normally allow up to five years for completing the harvest and finishing other contract activities. After the timber sale is completed the Forest Service would treat the accumulated activity fuels with prescribed fire. In the Tollgate project area, this would be done within two years, giving up to seven years total of project activities

The duration of effects from this type of project is closely tied to time for recovery of soil surface protection, primarily from vegetation regrowth and accumulation of duff and debris. Project design criteria and Best Management Practices (BMPs) keep bare soil surface exposure to a very small amount. Judging from personal observations of similar projects in this area soil surface protection would be expected to be back to natural levels within two to three years after cessation of disturbance. Therefore the maximum time frame for expected effects from project activities would be 10 years.

During that time, effects, if any, from other management activities in the area would also be contributing to cumulative effects. Parts of two other timber sale projects, the Lower Sheep and Loon projects, have been implemented in this same area. The timber sale components of both of these are now completed and project activities are winding down. Depending on weather, there is expected to be some prescribed fire for activity fuels treatments in the Loon project for two years. Depending on the timing of the implementation of the Tollgate project the last part of the Loon project fuels treatment might overlap the beginning of the Tollgate project by one or two years.

Since we are unaware of any other projects proposed or planned for these subwatersheds at this time, the time frame for consideration of cumulative effects from the Tollgate fuels reduction project would be 10 years after the timber sale contract is issued.

## Fish species known or expected in the area or the area potentially affected by the project

This part of the report meets the requirements of the Forest Service manual 2672.42 - Standards for Biological Evaluations.

"Biological Evaluations shall include the following,"

> "1. An identification of all listed, proposed, and sensitive species known or expected to be in the project area or that the project potentially affects. Contact the Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) as part of the informal consultation process for a list of endangered, threatened, or proposed species that may be present in the project area."

Table 3-8 presents ESA listed and U.S. Forest Service Region 6 sensitive species known or expected in streams on the Umatilla National Forest.

Of these, four ESA Threatened fish stocks and two R6 Sensitive species occupy streams in project watersheds (Table 3-8), and so are in locations where they may potentially be affected by project activities ().

Steelhead and redband trout (both *O. mykiss*) are also Management Indicator Species (MIS) for the Umatilla National Forest.

In addition native dace, suckers, and whitefish are also found in streams in project area subwatersheds.

### *Species status: Columbia River bull trout, ESA Threatened*

Columbia River bull trout occupy all three subbasins with Tollgate Fuels Reduction Project activities. They spawn and rear in the South Fork of the Walla Walla River, the North Fork of the Umatilla River, and Lookingglass Creek. The Bear Creek Subwatershed, which includes part of the mainstem Umatilla River, probably serves only as migratory and perhaps overwintering habitat for bull trout. Bear Creek itself is a very small and intermittent stream, and bull trout have never been reported there

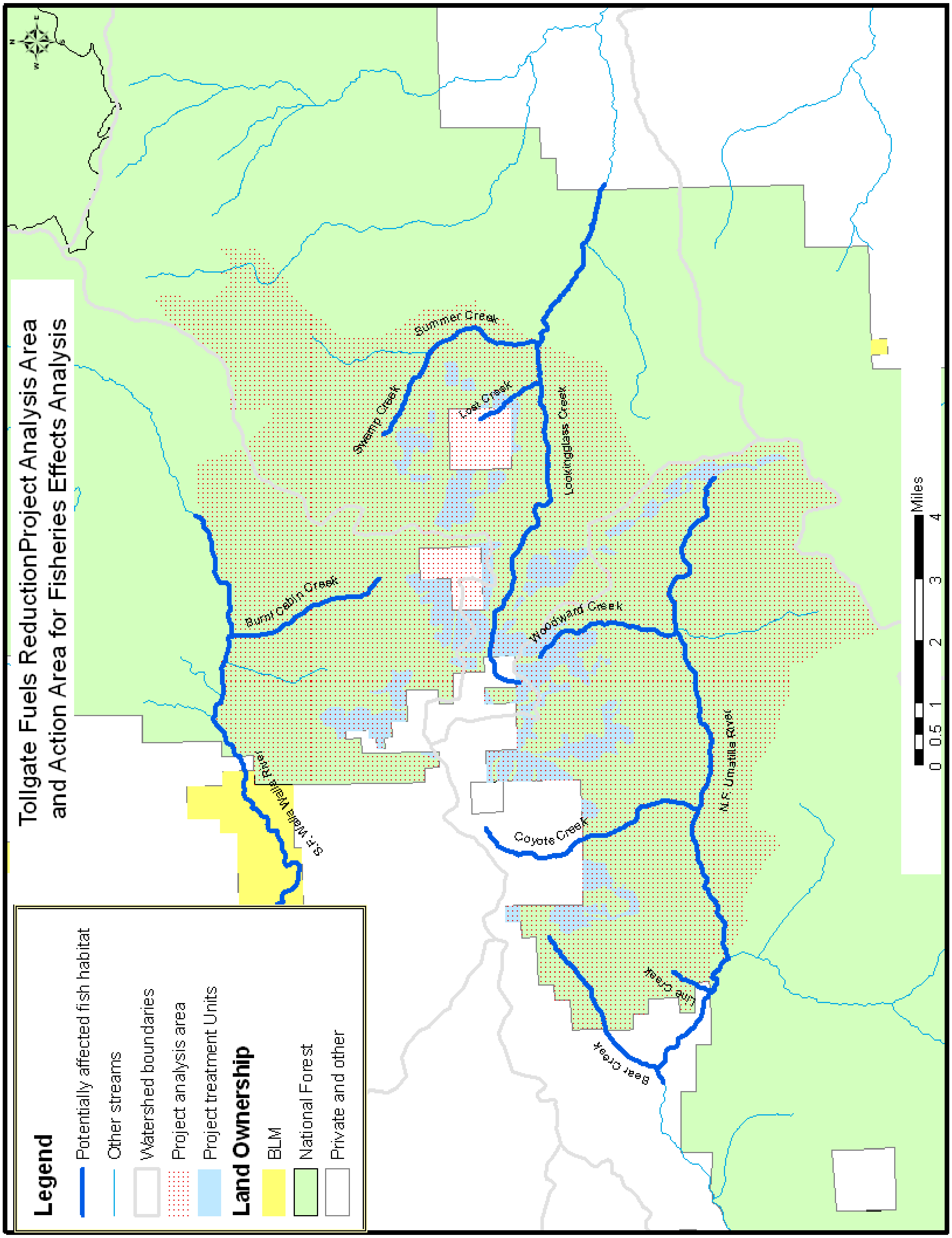


**Figure 3-3 — Streams in and near the Tollgate Fuels Project area**

**Table 3-8 — ESA Listed and R6 Sensitive Fish Species on the Umatilla National Forest Known or Expected in the Tollgate Fuels Project area**

| Stock | Classification | Presence by Watershed | | Potentially affected by the Tollgate Fuels Project? |
|---|---|---|---|---|
| | | Umatilla Watershed | Lookingglass Watershed | |
| Columbia River bull trout | ESA Threatened | Yes | Yes | Yes |
| Snake River spring/summer Chinook salmon | ESA Threatened | No | Yes | Yes |
| Snake River Fall Chinook Salmon | ESA threatened | No | No | No |
| Snake River steelhead | ESA Threatened | No | Yes | Yes |
| Mid-Columbia steelhead | ESA Threatened | Yes | No | Yes |
| Redband trout | R6 Sensitive and Umatilla N.F. MIS | Yes | Yes | Yes |
| Margined Sculpin | R6 Sensitive | Yes | Probably | Yes |
| West slope cutthroat trout | R6 Sensitive | No | No | No |
| Mid-Columbia River Spring-run Chinook Salmon | R6 Sensitive | No | No | No |

### Lookingglass Creek

Judging from spawning ground survey results, bull trout in Lookingglass Creek probably number a little over 100 adults. However, Lookingglass Creek habitat is accessible at least seasonally to the bull trout populations in the Wenaha River (no physical barriers), which is believed to be a strong population probably consisting of several sub-populations[10]. Both the Wenaha and Lookingglass sub-populations include the migratory form. There are additional sub-populations upstream in tributaries of the Grande Ronde River as well. Bull trout tagged in Lookingglass have been found far upstream in the Grande Ronde River so these populations are almost certainly connected

### South Fork Walla Walla River

Judging from spawning ground survey results, bull trout in the South Fork of the Walla Walla River probably number between 500 and 1000 adults. This population is seasonally linked to Mill Creek, which also has a fairly strong population. The migratory route between Mill Creek and the Walla Walla River includes a long stretch of concrete lined channel through the city of Walla Walla which makes upstream movement into upper Mill creek difficult for fish. A third (and perhaps fourth) sub-population inhabits the Touchet River system. All three sub-populations include the migratory form.

[10] Informal consensus of local state and federal fisheries biologists.

### North Fork Umatilla River

Bull trout in the North Fork of the Umatilla River are a very small and isolated population, probably numbering less than 100 adult individuals with no easy connection to any other bull trout population, but the migratory form is present.

### Bear Creek subwatershed

The Bear Creek subwatershed contains a part of the mainstem of the Umatilla River which may be used as overwintering habitat and a migratory corridor by bull trout from the North Fork of the Umatilla River. It becomes too warm in late summer for year-round occupancy by bull trout. Bear Creek itself is a very small, intermittent stream that is not known to have ever contained bull trout.

## *Species Status: Snake River Spring/Summer Chinook Salmon (Oncorhynchus tshawytscha). ESA Threatened, 1992*

By definition, Snake River spring/summer Chinook salmon occupy only streams and watersheds in the Snake River basin. Therefore the South Fork Walla Walla River, the North Fork Umatilla River and Bear Creek subwatersheds are not habitat for Snake River spring/summer Chinook Salmon.

### Lookingglass Creek

Spring Chinook salmon migrate into Lookingglass Creek and other Grande Ronde tributaries in this area on the high flows of spring runoff. They seek cool water refuges where they hold until spawning in mid-August or early September. The cool water of Lookingglass Creek provides attractive holding habitat for Chinook over the summer..

Spring Chinook salmon historically spawned in the Lookingglass system. In August of 1953, 308 Chinook salmon redds were counted in mainstem Lookingglass Creek[3]. This came to an average of 36 redds per mile over the area surveyed. Based on redd counts and numbers of fish actually observed, the Chinook run that year was estimated to be approximately 1500 fish[11].

That run was extirpated or nearly extirpated by management of the weir at the fish hatchery by Oregon Department of Fish and Wildlife (ODFW).

Presently, ODFW controls fish access to Lookingglass Creek and its tributaries upstream of the Lookingglass Fish Hatchery with a weir at the hatchery. For most of the time that the hatchery has been in place, Chinook have not been allowed to pass the weir. Beginning in 1992, though, some spring Chinook have been allowed to pass the weir in most years.[12] Those fish were all of Rapid River stock and so were not considered as a listed species under ESA. Beginning 2006, the Confederated Tribes of the Umatilla Indian Reservation seeded Lookingglass Creek with excess returning brood stock from Catherine Creek, which is also a tributary of the Grande Ronde River. These fish have been observed spawning in mainstem Lookingglass, mostly downstream of Summer Creek.

[11] From an old, yellowed typewritten report on file at the Walla Walla Ranger District. Author not identified, but appears to have been written by an Oregon State biologist.

[12] Source: Lookingglass Fish Hatchery Records, supplied by Debbie Eddy, ODFW, 2004.

Those fish are part of the Grande Ronde River stock. That is to say, they are native Snake River Chinook salmon. They have reproduced successfully and are now considered as part of the ESA-Threatened Snake River stock (Rebecca Dittmann, pers. com. 2011).

Snake River Chinook also spawn and rear in the Wenaha River just north of the project area.

### *Species Status: Snake river Fall Chinook Salmon*

By definition, Snake River Fall Chinook Salmon occupy only streams and watersheds in the Snake River basin. Therefore the South Fork Walla Walla River, the North Fork Umatilla River and Bear Creek subwatersheds are not habitat for Snake River Chinook salmon.

Fall Chinook salmon have never been recorded in Lookingglass Creek or any other streams potentially affected by the proposed project activities.

### *Species Status: Snake River steelhead trout (anadromous Onchorhynchus mykiss, ESA Threatened, 1997, Umatilla National Forest Management Indicator Species)*

By definition, Snake River steelhead trout occupy only streams and watersheds in the Snake River basin. Therefore the South Fork Walla Walla River, the North Fork Umatilla River and Bear Creek subwatersheds are not habitat for Snake River steelhead trout.

#### Lookingglass Creek

Adult Snake River steelhead trout typically leave the ocean as 3- to 6- year olds and begin their upriver migration in June of each year passing Bonneville by July. The steelhead trout spawning in the Grande Ronde subbasin enter the Grande Ronde River in two distinct migrations, one peaking in September and the other in March and April. Adults arriving in September hold in the Grande Ronde through the winter. Steelhead spawn here from March through May with the peak spawning activity occurring throughout the subbasin in late April and May.

Recent Spawning Ground surveys in the Lookingglass system, (Steve Boe, CTUIR, pers. comm., 2004) have found steelhead spawning in greatest number in main Lookingglass Creek and Little Lookingglass Creek. A few redds have also been found in Eagle Creek and Mottet Creek, and adult steelhead have been observed in Summer Creek (USDA Forest Service, 1992 stream survey). Steelhead are not believed to use Jarboe Creek, because there is little or no suitable spawning habitat downstream of the barrier waterfall (Pat Keniry, pers comm., 2004). Steelhead that spawn in upper Lookingglass Creek and its tributaries must migrate past the Lookingglass fish hatchery, where ODFW controls access to upstream reaches with a weir.

Adult steelhead may be present in streams of the project area anytime from September till June. Eggs remain in the gravel from one to two months, depending on water temperature, and fry emerge from May to June. Juvenile steelhead typically rear in their natal streams for up to 2 years, although depending on timing of emergence and spring runoff flows, fry may be washed some distance downstream, and rear in habitat some miles from their origin. They typically begin their downstream migration to the ocean with high spring flows in March through May two years after emergence. Therefore, juvenile steelhead would be present in most of these streams year-round.

In the Lookingglass watershed, *O. mykiss* occupy the most upstream reaches of the system, occurring even farther upstream than bull trout. This is undoubtedly because large springs downstream of the Lost Creek confluence supply the majority of the stream flow, so that in summer, stream reaches upstream of the Lost Creek confluence are actually warmer than the downstream reaches. This makes habitat in the warmer, upstream reaches more favorable for *O. mykiss* than for bull trout. Incomplete records from the Lookingglass fish hatchery document a wide range of steelhead released past the weir, from eight in 1996 to 118 in 2001.

### Species status: Mid-Columbia Steelhead, (Oncorhynchus mykiss, ESA Threatened, Umatilla National Forest Management Indicator Species)

By definition, Mid-Columbia steelhead trout occupy only streams and watersheds in the Mid-Columbia area. Therefore the North Fork Umatilla River and Bear Creek subwatersheds are habitat for mid-Columbia River steelhead trout, but Lookingglass Creek is not.

*O. mykiss* are the most common and widely distributed salmonid species in the Walla Walla & Umatilla sub basins. *O. mykiss* are found in all fish-bearing portions of the Umatilla and Walla Walla River systems. Their upstream range approximates that of bull trout except that they regularly occupy reaches farther downstream than bull trout and occupy streams where bull trout have not been documented. Their Life history pattern approximates that of the Snake River steelhead described above. Juvenile steelhead are not distinguishable from rainbow/redband trout in the field.

### Species Proposed for listing under ESA

There are currently no fish species proposed for ESA listing in the Tollgate Project analysis area.

### Rainbow/Redband Trout and Steelhead (Oncorhynchus mykiss, USFS Region 6 Sensitive, Umatilla National Forest Management Indicator Species)

Inland forms of *O. mykiss*, that is, those in the Columbia basin east of the Cascades are considered by some authorities to all be redband trout, including those sympatric with steelhead. Inland forms of *O mykiss* are genetically and phenotypically distinct from coastal forms (Wydoski and Whitney, 2003). Inland rainbow and redband trout are the same species as steelhead (*O. mykiss*) and juveniles cannot be distinguished phenotypically. Moreover, in at least some cases – where they are sympatric – they interbreed (Pearsons et al., 2007; Heath et al., 2008).

Because of the intrusive nature of the work, direct census of redband trout is potentially harmful to the fish and so has not been attempted in this area. Indirect census, through spawning ground surveys is difficult and costly and inherently imprecise because of the timing of spawning of this species, which takes place in early spring during high stream flows with reduced visibility of channel substrate. Estimates of the status of redbands in this area is therefore based on observations during aquatic habitat inventories, or other visits to the stream by biologists, which confirms their presence, but gives little in the way of numeric estimates. Because much of the aquatic habitat in these watersheds is in Designated Roadless Areas or Congressionally Designated Wilderness with little or no active management, the redband trout population would be expected to be at or near potential.

### Margined Sculpin (Cottus marginatus, USFS Region 6 Sensitive)

The Page and Burr (1991) list the range of the Region 6 “Sensitive” margined sculpin (Cottus marginatus) as the Columbia River drainage from the Walla Walla River to the Umatilla River. Wydoski and Whitney (2003) extend that range to the Touchet and Tucannon Rivers. They are not known to occur in any of the streams of the Grande Ronde River drainage and so would not be expected in the Lookingglass watershed. The reason that they are listed as Sensitive is probably due primarily to their presumed restricted range.

### *Westslope cutthroat trout (Oncorhynchus clarki lewisi). R6 Sensitive*

Westslope cutthroat trout appears on the Regional Forester's sensitive species list as documented present on the Umatilla National Forest. This documented occurrence is a disjunct population in the John Day River system. Cutthroat trout, including the west slope form of cutthroat trout, do not presently or historically occur within or near to project area streams.

### *Pacific Lamprey (Lampetra tridentata).*

Pacific lamprey is an anadromous fish species historically common in most cool water streams of the Pacific Northwest. Large numbers of adult lamprey used to ascend the Columbia and Snake Rivers to spawn in tributary streams, including the Grande Ronde River. Lamprey were extirpated from the Grande Ronde, Walla Walla and Umatilla Rivers by water withdrawals in the early 1900's and later construction of Columbia River dams in which fish ladders generally did not facilitate passage of lamprey.

Wydoski and Whitney (2003) give the present range of Pacific Lamprey as including the Snake River as far upstream as Hells Canyon Dam. The Grande Ronde River would therefore be accessible to them, but there are no recent reports of Pacific lamprey in the Grande Ronde system.

Lamprey adult run timing is slightly later than that of spring Chinook salmon. Although Pacific lamprey have been considered a pest species by Euro-Americans because they parasitize commercial and game fish species, American Indians harvested lamprey for food and the Confederated Tribes of the Umatilla Indian Reservation are in the process of re-introducing lamprey into the Walla Walla and Umatilla River systems.

### *Coho salmon (Oncorhynchus kisutch). Extirpated*

Coho salmon historically used the Grande Ronde River and some of its tributaries in the vicinity of the Tollgate Fuels Reduction project for migration and spawning (Cramer and Witty 1998). Coho have not been observed in the Grande Ronde since 1977, and large runs have not been observed since the early 1900's. All coho observed after 1966 were probably of hatchery origin.

The confederated Tribes of the Umatilla Indian Reservation have re-introduced coho into the Walla Walla and Umatilla River systems. Because they are not from a stock native to these watersheds, they are not listed under the Endangered Species Act.

### *Sockeye salmon (Oncorhynchus nerka). Extirpated*

Sockeye salmon used the Grande Ronde River adjacent to the project area as a migration corridor en route to Wallowa Lake to spawn, and of course for juveniles migrating to the ocean as well. Sockeye were extirpated from the Grande Ronde Basin by 1904 (Cramer and Witty 1998).

## Habitat Identification and description

### *Occupied*

There are 33.43 miles of occupied anadromous fish habitat and 28.19 miles of occupied resident fish habitat, for a total of 61.62 miles of occupied fish habitat in the four project area subwatersheds (Table 3-9). Bull trout, Chinook salmon, steelhead and redband trout use all four of the project area subwatersheds. Chinook salmon, steelhead, and redband trout use them for migration, rearing and spawning. Bull trout spawn in Lookingglass and North Fork Umatilla, but not in the Bear Creek subwatershed. Coho salmon probably used the Grande Ronde River in the vicinity of the mouth of Lookingglass Creek, but we have been unable to find records of them using Lookingglass Creek. They were extirpated from the Grande Ronde River system by 1977.

**Table 3-9 — Miles of Stream by Stream Class in the Tollgate Project Subwatersheds**

| | Stream Class[1] | | | | |
|---|---|---|---|---|---|
| **Stream** | **1** | **2** | **3** | **4** | **Totals** |
| Bear Creek | 11.62 | 5.17 | 34.99 | 92.23 | 144.01 |
| Middle South Fork Walla Walla | 7.31 | 6.86 | 38.32 | 62.84 | 115.33 |
| North Fork Umatilla | 8.07 | 7.53 | 28.29 | 64.6 | 108.49 |
| Upper Lookingglass | 5.43 | 6.63 | 12.34 | 37.43 | 61.83 |
| | 33.43 | 28.19 | 116.94 | 261.1 | 429.66 |

[1]Class 1 streams are anadromous fish habitat, class 2 streams are habitat of resident fish only, class 3 streams are perennial, non-fish bearing streams, and class 4 streams are seasonally intermittent.

### *Unoccupied, but essential for recovery*

With the possible exception of coho salmon, all known, historically occupied habitat of ESA listed or Region 6 Sensitive fish species in the four project subwatersheds is presently occupied. That is there is no known unoccupied fish habitat that is essential for recovery in any of the project area subwatersheds.

### *Unoccupied, but essential to meet Forest Service objectives for sensitive species*

Likewise, there is no known unoccupied fish habitat that is essential to meet Forest Service objectives for sensitive fish species.

## Existing conditions of habitat components

In order to evaluate the quality of the existing aquatic habitat, some standard for comparison must be identified. National Marine Fisheries Service and U.S. Fish and Wildlife Service have developed sets of criteria which have proven useful for meeting requirements of the Endangered Species Act and they have been adapted for use here in order to meet the requirements of the National Environmental Protection Act.

### *Water Quality*

The components of water quality most likely to affect fish in streams of the Tollgate Fuels project area are temperature, sediment, and chemical contamination.

#### Water Temperature

The Tollgate project affected environment is characterized in terms of water temperature in the hydrology section earlier in this chapter. Additional information on water temperature with respect to fisheries resources is included here.

The lower mile and mouth of bear Creek are on private land. The rest of the stream (upstream) is on National Forest. There are no records of fish of any species from Bear Creek but because there is no fish passage barrier at the mouth it is likely that small fish use the lowest, most downstream reaches (probably only a few hundred feet, as the gradient quickly becomes very steep farther upstream). At less than one CFS flow in mid-summer, the creek is so small that only very small fish could use it. Because of the cooling influence of the North Fork Umatilla River, the water temperatures in the mainstem Umatilla in this subwatershed are cooler than they are farther upstream in the South Fork.

Lookingglass Creek and the South Fork of the Walla Walla River are both near the center of designated Roadless areas, and the North Fork of the Umatilla River is in a congressionally designated wilderness, so all three are almost certainly at their natural potential temperatures, and so should therefore considered as *Properly Functioning* regarding water temperature. There has been a good deal more active management in the Bear Creek subwatershed (roads, timber harvest, livestock and homes on private land), and because water temperatures in the Umatilla River there are in the NMFS "At Risk" category, that watershed would be evaluated as *Functioning At Risk* for water temperature. Because of its elevation, aspect and natural vegetation, this stream has probably always been too warm to serve as prime bull trout spawning or rearing habitat.

### Chemical Contaminants/Nutrients

We know of no source of chemical contamination for streams on National Forest lands except occasional potential, accidental introduction of fire retardants during fire suppression work or a fuel spill related to other management activities. The Forest Service takes special pains to ensure that this does not happen, so that past and present Forest Service management activities do not increase levels of chemical contaminants in Lookingglass Creek, the South Fork of the Walla Walla River, the North Fork of the Umatilla River or the Bear Creek watershed. We know of no other source of chemical contaminants to these streams in the National Forest. Downstream and downslope from the National Forest, urban and agricultural runoff inevitably introduce some chemical contamination, so that in fact, the streams flowing from the National Forest would have a diluting effect to contaminant levels downstream. Streams in all three watersheds on National Forest lands in the analysis area should be considered *Properly Functioning* for chemical contaminants and nutrients.

## *Habitat Access:*

### Physical Barriers

The weir at the Lookingglass fish hatchery, several miles downstream of the Forest boundary can restrict access to all streams in the Lookingglass system except Jarboe Creek. ODFW personnel working at the hatchery control access to habitat upstream of the weir. However in recent years, they have been allowing some migratory fish to pass.

A natural waterfall in upper Lookingglass Creek, about two miles below the Langdon Lake headwaters area, limits access for migratory fish, but the stream is quite small here, and in the summer it is substantially warmer than the downstream reaches (see the water quality section of this report), so this part of the stream is not used by bull trout or Chinook salmon. This waterfall would be a migration impediment only to steelhead, but it is a longstanding natural barrier, so the stream should be considered as *Properly Functioning* regarding physical barriers.

There are no man-made impediments to fish passage in the North Fork of the Umatilla River or in the

South Fork of the Walla Walla River. There is a very large, longstanding log jam below Reeser Creek in the upper South Fork Walla Walla, but this developed naturally. It has continued to accumulate debris. In 2010 it appeared to have become a fish passage barrier; however, in the fall of 2011, large, presumably migratory fish, have been observed spawning upstream of this log jam (Bill Duke, ODFW, pers. comm.. 2011), so it appears that fish had been able to find ways over, under, around, or through this log jam.

The Umatilla River Road crosses Bear Creek a few feet upstream of its confluence with the Umatilla River. The crossing is over a large culvert which is backwatered, and has a natural appearing substrate (cobble and gravel) inside the culvert so this culvert is not a fish passage barrier. There may be other natural barriers upstream and the gradient itself may be a barrier.

Since the only impediments to passage in these watersheds on National Forest Lands are natural, these streams should also be considered as *Properly Functioning* regarding physical barriers.

## *Habitat Elements*

### Sediment and Substrate

The Tollgate project affected environment is characterized in terms of sediment in the hydrology section earlier in this chapter. Additional information on water temperature with respect to fisheries resources is included here.

At different times and different places, Field biologists and hydrologists have evaluated substrate quality on Walla Walla Ranger District streams in different ways. Beginning about 1989, surveyors recorded visual estimates of cobble embeddedness and dominant and subdominant substrate particle size. The 1997 and later protocols (USDA Forest Service 1997) did not require collection of either, but provided for categorical collection of substrate particle size data as a Forest option. The later protocol and forms made no provision for collection of embeddedness data, so if such data were collected, they had to be done as a locally managed parameter. The 1997 and later protocols used Wollman Pebble counts (USDA Forest Service 1997) to characterize stream substrate. Table 3-10 presents the available data for these parameters.

To be categorized as Properly Functioning, NMFS criteria specify that the dominant substrate particle size be cobble or gravel, or that embeddedness be < 20%. USFWS does not include the particle size criteria, but uses the same 20% criteria for embeddedness. Visual estimates of embeddedness can be imprecise (Wang et. al, 1996; Sylte and Fischenich 2003; Whitman et al. 2003), and so must be used cautiously, but all of the instances of embeddedness are in streams in designated Roadless or wilderness areas, and so are most certainly a natural condition. The only available data for a stream draining any part of the project that is not from a designated Roadless or wilderness area is that for them mainstem Umatilla River, and it was reported as 15% embedded with cobble as the dominant substrate particle size.

Wollman pebble counts seem less subjective. The Wollman values reported in Table 3-10 are for the percent of substrate particles smaller than 5.7 mm (or in some cases less than 6mm, depending on the protocol in the year the data was collected). The numbers in the table are in most cases an average of two transects and generally show what would be expected for these streams in a natural condition. The high values are usually depositional reaches where higher proportions of fine sediment would be expected.

The wide range of values for different reaches and occasional apparent conflict between the different methods of substrate characterization make assigning a functional category difficult, but since cobble or gravel is the dominant particle size for most of the surveyed reaches, together with the generally low values for cobble embeddedness, and the fact that most of the streams evaluated are in Roadless or wilderness areas suggests that these watersheds should be considered *Properly Functioning.*

**Table 3-10 — Tollgate Fuels Project Watersheds Stream Substrate Conditions**

| Stream | First Survey | | | | Second Survey | | |
|---|---|---|---|---|---|---|---|
| | % Embeddedness | Dominant/ Subdominant Particle size | Year Surveyed | Dominant/ Subdominant Particle size | % Embeddedness | Wollman % < 5.7 mm an, | Year Surveyed |
| South Fork Walla Walla River | | | | | | | |
| South Fork Walla Walla River, Reach 1[3] | 24 | co/gr | 1995 | | | | |
| South Fork Walla Walla River, Reach 2[4] | | co/gr | 1995 | | | | |
| South Fork Walla Walla River, Reach 3[4] | | co/sb | 1995 | | | | |
| South Fork Walla Walla River, Reach 4[4] | | co/gr | 1995 | | | | |
| South Fork Walla Walla River, Reach 5[4] | | co/gr | 1995 | | | | |
| Burnt Cabin Gulch Creek | 13 | co/gr | 1995 | | 46[1] | | 2008 |
| Umatilla River | | | | | | | |
| Umatilla River below forks | 15 | co/gr | 1992 | na | 17 | | 1997 |
| North Fork Umatilla River Reach 1 | 8 | co/gr | 1993 | gr/sa | | | 2009 |
| North Fork Umatilla River Reach 2 | 13.5 | co/sb | 1993 | gr/sa | | | 2009 |
| North Fork Umatilla River Reach 3 | 42 | co/gr | 1993 | gr/sa | | | 2009 |
| North Fork Umatilla River Reach 4 | 32 | co/sb | 1993 | | | | |
| Coyote Creek | 3 | co/gr | 1993 | | | | |
| West Fork Coyote Creek | 2 | gr/sb | 1993 | | | | |
| Johnson Creek | 16 | co/sb | 1995 | | | | |
| Woodward Creek | 15.3 | sb/co | 1994 | | | | |
| Lookingglass Creek | | | | | | | |
| Lookingglass Reach 1 | 19 | co/gr | 1992 | | | 7 | |
| Lookingglass Reach 2 | 19 | co/gr | 1992 | | | 7 | |
| Lookingglass Reach 3 | 18 | gr/gr | 1992 | | | 9 | |
| Lookingglass Reach 4 | 36 | gr/co | 1992 | | | 17.5 | |
| Lost Creek, Reach 1 | 30 | co/sb | 1992 | | | | |
| Lost Creek, Reach 2 | 28 | co/sb | 1992 | | | 13 | |
| Swamp Creek, Reach 1 | 25 | gr/co | 1992 | | | 15.5 | |
| Swamp Creek, Reach 2 | 35 | sa/gr | 1992 | | | | |
| East Fork Swamp Creek | na | sa/co | 1992 | | | 8.5 | |
| Summer Creek, Reach 1 | 19 | co/gr | 1992 | | | 47.5 | 2000 |
| Summer Creek, Reach 2 | 35 | gr/gr | 1992 | | | | |

[1]Survey was done following the burnt cabin fire and after a winter and spring which produced some large debris flows in this canyon, which introduced large amounts of hillslope sediments into the stream channel. This is almost certainly the explanation for the large difference between the 1995 and 2008 values for embeddedness.

### Large Woody Debris

Woody debris frequency in the Tollgate Project Planning Area was recorded during aquatic habitat inventories beginning in 1992 (Table 3-11). Some of these streams were later resurveyed. The values for large woody debris frequency vary widely between these two data sets. This discrepancy is due, at least in part, to a change in aquatic habitat inventory protocol between the 1990-91 and 1997 and later surveys. In the first group of surveys, trees and snags outside of the bank full stream channel were counted if they leaned over the bank full width area or were suspended above it (USDA Forest Service 1990). For the 1997 and later inventories, surveyors counted only trees, snags, and woody debris within the bank full channel (USDA Forest Service 1997). That is, in the 1997 and later surveys, only woody debris that could actually interact with the stream at bank full flows was counted. In heavily forested areas, many trees outside of the bank full channel would lean over the channel, and this would inflate the earlier count, yielding the much higher numbers seen in the first surveys (Table 3-11). Burnt Cabin Creek is an exception to the

**Table 3-11 — Woody Debris Frequency**

| | First Survey | | Second Survey | |
|---|---|---|---|---|
| **Stream and Reach** | **pieces/mile[1]** | **Year Surveyed** | **pieces/mile[1]** | **Year Surveyed** |
| South Fork Walla Walla River | | | | |
| South Fork Walla Walla River, Reach 1[3] | 32.1 | 1995 | | |
| South Fork Walla Walla River, Reach 2 | 30 | 1995 | | |
| South Fork Walla Walla River, Reach 3 | 34.7 | 1995 | | |
| South Fork Walla Walla River, Reach 4 | 25.0 | 1995 | | |
| South Fork Walla Walla River, Reach 5 | 22.2 | 1995 | | |
| Burnt Cabin Gulch Creek | 23.3 | 1997 | 48 | 2008 |
| Umatilla River | | | | |
| Umatilla River below forks | 6.4 | 1992 | 6.4 | 1997 |
| North Fork Umatilla River Reach 1 | 36.7 | 1993 | 12.1 | 2009 |
| North Fork Umatilla River Reach 2 | 49.1 | 1994 | 25.1 | 2009 |
| North Fork Umatilla River Reach 3 | 111.8 | 1995 | 13.5 | 2009 |
| North Fork Umatilla River Reach 4 | 45.3 | 1995 | | |
| Coyote Creek | 40.1 | 1993 | | |
| West Fork Coyote Creek | 56 | 1993 | | |
| Johnson Creek | 25 | 1995 | | |
| Woodward Creek | 41.6 | 1994 | | |
| Lookingglass Creek | | | | |
| Lookingglass Reach 1 | 47.2 | 1992 | | |
| Lookingglass Reach 2 | 56.2 | 1992 | | |
| Lookingglass Reach 3 | 30.4 | 1992 | | |
| Lookingglass Reach 4 | 84.3 | 1992 | | |
| Lost Creek, Reach 1 | 83.8 | 1992 | | |
| Lost Creek, Reach 2 | 88.6 | 1992 | | |
| Swamp Creek, Reach 1 | 152.8 | 1992 | | |
| Swamp Creek, Reach 2 | 101.5 | 1992 | | |
| Summer Creek, Reach 1 | 77.8 | 1992 | 54.3 | 2000 |
| Summer Creek, Reach 2 | 131.9 | 1992 | 67 | 2000 |

[1]Count of pieces > 35 ft. long and >12” diameter at a point 35 ft. from the butt.

pattern of lower values for the second survey. This is almost certainly because a wildfire burned much of the Burnt Cabin canyon between the times of the first and second surveys, which resulted on many more trees being dropped into the stream channel.

Values derived from the later protocol are much more useful for evaluating actual condition of aquatic habitat. The earlier protocol might suggest a potential future condition, but it is not informative of existing habitat condition. Therefore this evaluation will rely primarily on habitat inventories taken in 1997 and later for woody debris values. Using data from the most recent protocol for the seven stream reaches using that protocol, four reaches would meet Pacfish RMO's as well as NOAA Fisheries and USFWS criteria for Properly Functioning.

There has been no timber harvest inside the RHCAs of the stream reaches surveyed, however, the Mainstem Umatilla River in the Bear Creek watershed has a road in the valley bottom, adjacent to much of the stream and the presence and management of this road reduces potential for development of instream woody debris.

The other two reaches with low woody debris frequency are in the North Fork Umatilla Wilderness, so the low woody debris frequency there is a primarily natural condition. One management activity, fire suppression, could delay woody debris input to stream. However, as has been evidenced by the situation in Burnt Cabin Canyon Creek, that wood eventually enters the stream, only the timing having been altered. All streams in the project area subwatersheds except the Mainstem Umatilla River should be considered *Properly Functioning* for large woody debris frequency. The Mainstem Umatilla River (Bear Creek subwatershed) should be considered as *Not Properly Functioning* for large woody debris frequency.

### Pool Frequency

Reported pool frequencies for streams in the project area vary widely (Table 3-12). This is likely due at least in part to differing inventory protocols. U.S. Forest Service Region 6 changed the inventory protocol between 1990-92 surveys and the 1997 and later ones. In the earlier protocol, all habitat units (pools, riffles, glides) had to be longer than wide in order to be counted as a separate unit. Plunge pools created by woody debris are commonly wider than long, and so would not be counted separately. Following the earlier protocol, such pools would be counted as part of the previous unit (most often a downstream riffle). For the 1997 and later protocol, channel spanning plunge pools would be counted as a separate habitat unit, even if they were wider than long. This would be expected to produce higher pool frequency values, especially in streams with substantial quantities of woody debris, and may account for the generally higher pool frequencies reported for the second survey.

NOAA Fisheries and USFWS differ in their standards for Properly Functioning Condition for this parameter. National Marine Fisheries Service, (1996) references the Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin (USDA Forest Service, 1994) for its pool frequency standards, and for monitoring protocol for determining pool frequency. This protocol requires tally of only pools greater than 1 meter (~three feet) deep in low gradient (1%, or in some cases 2%), Rosgen (1996) C-type channels. None of the stream reaches in the project area fit the criteria for gradient (Table 3-12), and so the pool frequency indicator of properly functioning condition as given by NMFS would not be applicable.

The U.S. Fish and Wildlife Service referenced a paper by Overton et al. (1995) for natural conditions in the Salmon River Basin, which takes into account such factors such as channel type and geology, and does not include the depth criterion. The U.S. Fish and Wildlife Service used a summary of *all streams* from the paper by Overton et al. for pool frequency standards in their Matrix of Pathways and Indicators (USFWS 1998). However, as Overton et al. state in their report;

> "When using variables to assess the conditions of project streams, the user should select numeric values from stream reaches that are most similar in geology, vegetation, geomorphology, and climate."

**Table 3-12 — Stream Classification by Width and Gradient and Pool Frequency in the Tollgate Project Area**

| Stream and Reach | Wetted width | Gradient | Rosgen Class | Corresponding pool Frequency from Overton for Volcanic (V) or all Geologic (A) types[3] | Actual Pools/mile | Variation from Mean ($\pm \sigma$) |
|---|---|---|---|---|---|---|
| South Fork Walla Walla River | | | | | | |
| South Fork Walla Walla River, Reach 1[1] | 33.5 | 2 | B | $14.8 \pm 3.57$ (V, n=4) | 4.01 | $>2\sigma$ |
| South Fork Walla Walla River, Reach 2[2] | 27.8 | 3 | B | $20.9 \pm 4.4$ (V, n=6)) | 9.29 | $>2\sigma$ |
| South Fork Walla Walla River, Reach 3[2] | 24.7 | 3 | B | $21.76 \pm 2.18$ (V, n=11) | 24.28 | $<\sigma$ |
| South Fork Walla Walla River, Reach 4[2] | 17.1 | 7 | A | $24.42 \pm 7.92$ (A, n=8) | 25.01 | $<\sigma$ |
| South Fork Walla Walla River, Reach 5[2] | 10.9 | 2 | B | $50.26 \pm 10.93$ (V, n=4) | 44.62 | $<\sigma$ |
| Burnt Cabin Gulch Creek[1] | 9.8 | 11 | A | $10.8 \pm 4.9$ (A, n=6)) | 19.9 | $<\sigma$ |
| Umatilla River | | | | | | |
| Umatilla River below forks | 47.7 | 2 | B | $7.76 \pm 1.07$ (A, n=13) | 16.7 | $<\sigma$ |
| North Fork Umatilla River Reach 1[1] | 29.6 | 2 | B | $20.9 \pm 4.4$ (V, n=6) | 9.44 | $>2\sigma$ |
| North Fork Umatilla River Reach 2[1] | 16.0 | 4 | B | $30.8 \pm 1.08$ (V, n=6) | 26.27 | $>2\sigma$ |
| North Fork Umatilla River Reach 3[1] | 17.1 | 8 | A | $24.42 \pm 7.92$ (A, n=8) | 15.64 | $>\sigma$ |
| North Fork Umatilla River Reach 4[1] | 11.1 | 10 | A | $33.84 \pm 8.7$ (A, n=12 ) | 17.23 | $>\sigma$ |
| Coyote Creek[1] | 8.9 | 5 | A | $10.81 \pm 4.9$ (A, n=6) | 15.1 | $<\sigma$ |
| West Fork Coyote Creek[1] | 8.5 | 10 | A | $10.81 \pm 4.9$ (A, n=6 ) | 16.84 | $<\sigma$ |
| Johnson Creek[2] | 8.3 | 9 | A | $10.81 \pm 4.9$ (A, n=6) | 56 | $<\sigma$ |
| Woodward Creek[1] | 5 | 15 | A | $10.81 \pm 4.9$ (A, n=6) | 41.6 | $<\sigma$ |
| Lookingglass Creek | | | | | | |
| Lookingglass Reach 1[1] | 27.2 | 2 | B | $20.95 \pm 4.4$ (V, n=6) | 2.99 | $>2\sigma$ |
| Lookingglass Reach 2[1] | 13.1 | 4 | B | $59.26 \pm 10.93$ (V, n=4) | 9.07 | $>2\sigma$ |
| Lookingglass Reach 3[1] | 18.1 | 5 | B | $30.82 \pm 1.08$ (V, n=6) | 6.40 | $>2\sigma$ |
| Lookingglass Reach 4[1] | 9.7 | 6 | A | $10.81 \pm 4.9$ (A, n=6) | 8.65 | $<\sigma$ |
| Lost Creek, Reach 1[1] | 5.3 | 14 | A | $10.81 \pm 4.9$ (A, n=6) | 13.8 | $<\sigma$ |
| Lost Creek, Reach 2[1] | 4.7 | 16 | A | 18.2 (A, n=2) | 8.6 | $>2\sigma$ |
| Swamp Creek, Reach 1[1] | 7.5 | 8 | A | $10.81 \pm 4.9$ (A, n=6) | 5.81 | $<\sigma$ |
| Swamp Creek, Reach 2[1] | 5.1 | 13 | A | $10.81 \pm 4.9$ (A, n=6) | 8.90 | $<\sigma$ |
| Summer Creek, Reach 1[1] | 15.6 | 4 | B | $30.8 \pm 1.08$ (V, n=6) | 27.8 | $>2\sigma$ |
| Summer Creek, Reach 2[1] | 8.0 | 7 | A | $10.81 \pm 4.9$ (A, n=6) | 44.1 | $<\sigma$ |

[1] Reach or drainage area within, partly within, or downstream of project area. Could potentially be affected by project activities.

[2] Same watershed, but outside and upstream of project area. Would not be directly affected by project activities. Included as a reference for conditions in the watershed.

[3] Geology of the area is volcanic, so wherever Overton's sample size was > 4, values for volcanic geology were used. When Overton's reported sample size was <4, values for all geologic types in that slope category were used.

Since Overton et al. report pool frequencies by both Geology and Rosgen Channel type, it seems more reasonable to use those values whenever feasible. For this analysis, wherever possible, the more specific values from Overton et al. are used (Table 3-12). However, even Overton's values vary widely for similar sized streams and in some cases, the sample size is quite small and ultimately it probably makes more sense to temper pool frequency values with judgments of natural pool-forming processes. That is, if natural pool-forming processes appear to be functioning normally, then the pool frequency parameter should be considered as Properly Functioning.

Initially, for this analysis, pool frequencies within one standard error (σ) of Overton's mean for streams of the same width and gradient category were considered as Properly Functioning (PF) for the pool frequency parameter. Stream reaches with pool frequencies more than one standard error below the mean were initially considered At Risk (AR), and streams more than two standard errors below the mean were considered Not Properly Functioning (NPF) for pool frequency.

Following that convention, 15 of 25 stream reaches in the Project subwatersheds would have been considered Properly Functioning for pool frequency, two would be considered At Risk, and nine would be considered Not Properly Functioning (Table 3-12). However, other factors really should be taken into account in making such judgments. For example some of the pools in these systems are created by instream woody debris. Woody debris input to these streams tends to be episodic following fires, insect or disease outbreaks, or windstorms, and pool frequencies would to some extent, follow the events that introduce woody debris into the streams. Variations in stream flow such as those produced by unusual winter storms, or exceptionally high spring runoff can fill or create pools as well. It would be well to be cautious in use of values such as presented by Overton et al. until a much larger sample size is available, and even then to take into account some of the other variables that can affect pool frequency. At the present time, it seems that a more defensible approach would be to consider whether natural processes are functioning normally in the watersheds and streams in question, and if they are, to presume that pool frequencies are normal as well.

In this case, and excepting the mainstem Umatilla River (Bear Creek watershed), all of the stream reaches reported here are in either large Roadless areas or congressionally designated wilderness, and are mostly distant from active management activities.

In other words, natural processes here are functioning essentially unimpeded so pool frequencies here are almost certainly at or near their natural potential and therefore should be considered *Properly Functioning* for the Lookingglass, South Fork Walla Walla and North fork Umatilla subwatersheds. In the Bear Creek subwatershed, pool frequencies are within one σ of Overton's mean (actually > the mean) and would be considered *Properly Functioning* for pool frequency on that basis alone.

### Large Pools

Pools greater than one meter deep are very rare in all of these streams. As explained in the previous section for pool frequency, this criterion for pool quality (> 1 meter deep, in Rosgen C-type channels) is almost certainly not appropriate for these streams because they are mostly not C-type channels. Those few pools deeper than one meter are likely to be at the base of impassable waterfalls. Because the numeric criterion for large pools is not appropriate to these streams (many large pools would not be expected), all six subwatersheds were judged as *Properly Functioning* for this parameter.

### Off-Channel Habitat

Most of the streams in the analysis area are relatively high gradient, Rosgen type A or B streams that would not naturally develop many ponds, oxbows or side channels, and so absence of these features does not necessarily indicate degraded habitat. The exceptions are parts of mainstem Lookingglass Creek and the South Fork of the Walla Walla River where beaver activity and accumulations of large woody debris have created side channels and sections of braided channel. Both bull trout and Chinook salmon seem to favor these sections for spawning (DMC personal observation). The Mainstem Umatilla River in the

Bear Creek subwatershed is a lower gradient reach where side channels might be expected to develop, but valley bottom roads and other development have restricted the development of side channels here.

This criterion is not very useful for evaluating the condition of the aquatic habitat in the rest of these streams, since because of their gradient this standard is meaningless. All three wilderness /Roadless subwatersheds are therefore judged to be *Properly Functioning* for off-channel habitat. The Bear Creek watershed would be *Not Properly Functioning*.

## *Channel Condition and Dynamics:*

### Wetted Width/Maximum Depth Ratio

Wetted width/depth ratios vary with stream stage and channel type. The USFWS Matrix criteria are stated as average wetted width/max depth in scour pools. These values are not reported with USFS standard aquatic habitat inventory results, but can be estimated by using the average wetted width and residual pool depth, which are part of the standard habitat inventory report. To estimate actual pool depth at the reported wetted width, it is necessary to add back the depth at the pool tail crest. In small streams such as Summer Creek, this probably averages between 0.1 and 0.2 ft. In larger streams such as Lookingglass Creek it may be as much as 0.5ft. (DMC personal observation). I have chosen 25 stream reaches to evaluate this parameter (Table 3-13), 20 of them from drainages (small portions of a subwatershed) with project activities, and 5 additional in the same subwatersheds just to provide a more complete picture of watershed conditions. Of those 25 stream reaches 14 had a width/depth ratio of less than ten the first time they were surveyed. Twelve of these reaches were later surveyed a second time, and four of those previously reported as having a width/depth < 10 were now reported as width/depth > 10, while one that had been previously > 10 now was <10.

This would seem to suggest that habitat conditions in these streams have been deteriorating. However, during that time, the Forest Service has not undertaken any activities in these watersheds of a nature and at a level that are known to cause an increase in channel width/depth ratios. Several possible explanations come to mind:

1) The precision of measurements of stream width and depth is low. Forest Service Region 6 protocol directs surveyors to visually estimate width. This visual estimation technique leaves open the possibility of considerable variability in reported values.
2) Different personnel surveyed these streams the second time. Although these estimates are calibrated by measuring a subset of the habitat units, different surveyors may not select the same sites for estimation and measuring the stream width. Selection of different locations to estimate wetted stream width would not be accounted for in the calibration, and could contribute to variability in the final value.
3) The stream flow may have been higher or lower at the time of the second survey. This also would almost certainly have produced a different value for width/depth.
4) The stream channel has changed in most, if not all, of the streams. In Lookingglass Creek for example, landslides and trees falling into the creek have altered the channel substantially over short distances.

Excepting the mainstem Umatilla River, all of the stream reaches reported here are in either large Roadless areas or congressionally designated wilderness, and are mostly distant from active management activities, so the conditions here are probably natural or at least within the natural range of variation of streams in these settings and so the width depth ratios there are most likely a natural condition, they should be considered *Properly Functioning* for all four subwatersheds.

**Table 3-13 — Estimated3 Wetted Width/Maximum Depth Ratios for Pools in Streams in the Tollgate Fuels Reduction Project Analysis Area**

| | First Survey | | Second Survey | |
|---|---|---|---|---|
| **Stream & Reach** | **Wetted Width/-Maximum Depth** | **Year surveyed** | **Wetted Width/-Maximum Depth** | **Year surveyed** |
| South Fork Walla Walla River | | | | |
| South Fork Walla Walla River, Reach 1[1] | 12.8 | 1995 | | |
| South Fork Walla Walla River, Reach 2[2] | 13.9 | 1995 | | |
| South Fork Walla Walla River, Reach 3[2] | 10.7 | 1995 | | |
| South Fork Walla Walla River, Reach 4[2] | 13.2 | 1995 | | |
| South Fork Walla Walla River, Reach 5[2] | 9.9 | 1995 | | |
| Burnt Cabin Gulch Creek[1] | 7.5 | 1995 | 7.7 | 2008 |
| Umatilla River | | | | |
| Umatilla River below forks[1] | 10.4 | 1997 | | |
| North Fork Umatilla River Reach 1[1] | 19.7 | 1993 | 13.2 | 2009 |
| North Fork Umatilla River Reach 2[1] | 11.4 | 1993 | 8.3 | 2009 |
| North Fork Umatilla River Reach 3[1] | 11.4 | 1993 | 10.1 | 2009 |
| North Fork Umatilla River Reach 4[1] | 7.9 | 1993 | | |
| Coyote Creek[1] | 11.9 | 1993 | | |
| West Fork Coyote Creek[1] | 7.1 | 1993 | | |
| Johnson Creek[2] | 7.5 | 1995 | | |
| Woodward Creek[1] | 3.8 | 1994 | | |
| Lookingglass Creek | | | | |
| Lookingglass Reach 1[1] | 21.0 | 1992 | 14.3 | 1999 |
| Lookingglass Reach 2[1] | 8.5 | 1992 | 9.3 | 1999 |
| Lookingglass Reach 3[1] | 7.1 | 1992 | 10.9 | 1999 |
| Lookingglass Reach 4[1] | 7.2 | 1992 | 10.2 | 1999 |
| Lost Creek, Reach 1[1] | | | | |
| Lost Creek, Reach 2[1] | 4.7 | 1992 | | |
| Swamp Creek, Reach 1[1] | 7.3 | 1999 | 9.7 | 1999 |
| Swamp Creek, Reach 2[1] | 4.0 | 1999 | 9.4 | 1999 |
| Summer Creek, Reach 1[1] | 7.3 | 1992 | 12.3 | 2000 |
| Summer Creek, Reach 2[1] | 4.5 | 1992 | 10.7 | 2000 |
| | | | | |

[1] Reach or drainage area within, partly within, or downstream of project area. Could potentially be affected by project activities.
[2] Same watershed, but outside and upstream of project area. Would not be directly affected by project activities.
[3] Estimated from average wetted widths and average residual pool depths reported from USFS aquatic habitat inventories.

### Streambank Condition

Actively eroding stream banks above bank full height are rare (probably < 10%, DMC, personal observations) in these subwatersheds. For example, there are several short sections with unstable banks in Lookingglass Creek between the Forest boundary and Summer Creek that are the result of natural channel evulsion following high spring flows. In one case the channel moved to the opposite side of the valley bottom and appears to have actually improved fish habitat by adding woody debris to the channel, increasing habitat complexity, and sorting substrate, producing accumulations of gravel used by Chinook salmon and bull trout for spawning (DMC, pers. obs.).

In another instance, farther upstream, beaver activity has moved the channel, also producing some short distances of raw banks. These are completely natural situations, and although they have resulted in addition of sediment to the stream, overall, they have maintained or improved aquatic habitat, and so these streams and subwatersheds are *Properly Functioning* regarding streambank conditions.

### Floodplain Connectivity

The mainstem of The South Fork Walla Walla River, Lookingglass Creek, and the North Fork of the Umatilla River all have natural access to their floodplains. These streams are not entrenched except for occasional very short sections. Sections of some of the streams in these subwatersheds are confined by topography, especially the upper reaches of some of the tributary streams. These are high gradient Rosgen A and B type streams where this is a natural condition.

Parts of the Mainstem Umatilla River (Bear Creek Watershed) have a road, rip rap revetment, and gabions along the stream, which constrains the stream, and reducing its access to the floodplain in some places.

The South Fork of the Walla Walla River, the North Fork of the Umatilla, and Lookingglass Creek watersheds are all *Properly Functioning* with regard to floodplain connectivity, and the Umatilla River in the Bear Creek watershed is Functioning *At Risk*.

## *Flow/Hydrology*

### Water Yield and Changes in Peak/Base Flows

Table 3-14 in the hydrology section above displays the results of this model for conditions in 2011. Subwatersheds in the analysis area are below any threshold of concern that has been identified. Management caused changes in water yield, timing of flow, or peak flow are negligible. ETA's are substantially below levels where there might be effects to water yield or peak flow (Table 3-14). Therefore, these four subwatersheds should be considered as *Properly Functioning* for peak and base flows.

**Table 3-14 — Tollgate Fuels Project Subwatersheds Disturbance History as Equivalent Clear-cut Acres**

| Subwatershed Name (HUC) | Watershed Area (acres) | Umatilla N.F. Acres in Subwatershed | ECA/ETA[1] as of September 2011, % of National Forest acres |
|---|---|---|---|
| Upper Lookingglass (HUC 170601041001) | 15486 | 13969 | 2.0 |
| Middle South Fork Walla Walla River (HUC 170701020102) | 17474 | 13915 | 10.5 |
| North Fork Umatilla River (HUC 170701030104) | 17478 | 19823 | 1.3 |
| Bear Creek (Umatilla River below forks – HUC 170701030106) | 20042 | 8726 | 0.5 |
| [1]For National Forest lands only. ECA values (% of subwatershed) supplied by Stacia Peterson, Umatilla N.F. North End Hydrologist | | | |

### Drainage Network Increase

Criteria presented by both NOAA Fisheries and USFWS are not numerically specific regarding standards for this parameter. NOAA Fisheries suggests that about 5% increase would be considered "moderate." ESA consultation teams in this area have been using a convention of 200 feet of drainage network increase for every road – stream crossing. There seems to be little in the way of studies or data to back this up, but in the absence of some better method of evaluating this parameter this is presently accepted. So, assuming a 200 foot increase in drainage network length for every road-stream crossing, all of the watersheds would be well below the 5% increase suggested as "moderate by NOAA Fisheries (Table 3-15). These subwatersheds should all be considered as *properly functioning* regarding drainage network increase.

**Table 3-15 — Tollgate Fuels Project Analysis Area Increase in Drainage Network Length Due to Road and Stream Crossings**

| Subwatershed (HUC) | Total Road-Stream Crossings[2] | Total NF stream channel miles in watershed | Road Crossings per mile of stream | Percent increase in drainage network length due to roads[1, 2] | Functional categorization for ESA Consultation[3] |
|---|---|---|---|---|---|
| Upper Lookingglass (HUC 170601041001) | 36 | 61.83 | 0.58 | 2.21% | PF |
| Middle South Fork Walla Walla River (HUC 170701020102) | 25 | 115.33 | 0.22 | 0.82 | PF |
| North Fork Umatilla River (HUC 170701030104) | 29 | 108.49 | 0.27 | 1.01 | PF |
| Bear Creek (Umatilla River below forks – HUC 170701030106) | 10 | 144.01 | 0.069 | 0.26 | PF |

[1]Based on an assumed 200 feet increase in stream network length for each road x stream crossing.
[2]On National Forest lands.
[3]PF = functioning appropriately/properly functioning, AR = functioning at risk/at risk, NPF = functioning at unacceptable risk/not properly functioning.
[4]Values for road x stream crossings were produced in GIS by intersecting road and stream layers. Because of mapping imprecision in the case of the Phillips Creek watershed, several roads that closely parallel streams appear incorrectly in GIS as crossing multiple times. So accurate numbers for this parameter in the Phillips Creek Watershed are not presently available, but casual observation (DMC) suggests that road x stream crossings in the Phillips Creek watershed are at least as common as in Little Lookingglass or Gordon Creeks.

## *Watershed Conditions*

### Road Density and Location

The Tollgate project affected environment is characterized in terms of road density and associated effects on water quality in the hydrology section earlier in this chapter. Additional information on water temperature with respect to fisheries resources is included here.

NOAA Fisheries and USFWS criteria for road density do not distinguish between closed and open roads. USFWS criteria are tougher, requiring < 1 mile/mile$^2$ for a functioning appropriately category. Only the North Fork Umatilla River and Bear Creek subwatersheds would qualify as properly functioning under that criterion (Table 3-16). However, even the Bear Creek subwatershed has a valley bottom roads and so would not qualify as properly functioning.

In summary, regarding road density, the Upper Lookingglass watershed falls into the *Not Properly Functioning* category and the other three fall into the Functioning At *Risk categories*. However, it should

**Table 3-16 — Road Density on National Forest Lands by Subwatershed[1,5]**

| Subwatershed (HUC) | All Roads ($mi/mi^2$) | Miles of Roads Within RHCA's | Miles of road/mile of stream | USFWS Functional Condition[3, 4] | NOAA Fisheries Functional Condition[3, 4] |
|---|---|---|---|---|---|
| Upper Lookingglass (HUC 170601041001) | 3.6 | 3.7 | 0.06 | FAUR | NPF |
| Middle South Fork Walla Walla River (HUC 170701020102) | 1.0 | 2 | 0.02 | FAR | AR |
| North Fork Umatilla River (HUC 170701030104) | 1.6 | 2.8 | 0.03 | FAR | AR |
| Bear Creek (Umatilla River below forks – HUC 170701030106)[5] | 0.5 | 1.2 | 0.02 | FAR | AR |

[1]Source: Stacia Peterson, District Hydrologist.
[2]For purposes of this analysis, roads inside of RHCAs are considered valley bottom roads.
[3]USFWS: FA = functioning appropriately, FAR = functioning at risk, FAUR = functioning at unacceptable risk. For NMFS: PF= Properly Functioning, AR= At Risk, NPF= not properly functioning.
[4]For USFWS, FA = <1 $mi/mi^2$, no valley bottom roads; FAR= 1 – 2.4 $mi/mi^2$, some valley bottom roads; FAUR= >2.4 $mi/mi^2$, many valley bottom roads; For NMFS, PF= <2 $mi/mi^2$, no valley bottom roads; AR= 2 – 3 $mi/mi^2$, some valley bottom roads; NPF= >3 $mi/mi^2$, many valley bottom roads.
[5]Values in this table are for land within National Forest boundaries only.

be pointed out that substantial portions of the Middle South Fork Walla Walla, Upper Lookingglass, and North Fork Umatilla subwatersheds are either wilderness or designated Roadless areas, and so the roads are mostly concentrated high in the watersheds, mostly on ridge tops, and well away from fish-bearing streams. Numbers alone can be deceiving, as the Bear Creek subwatershed has a major road running up the bottom of the subwatershed, right along the Umatilla River, so that effects of roads in this subwatershed are much more pronounced than in the other three, which are actually in a much better situation than these numbers alone would indicate.

### Disturbance History

Historically, natural disturbances in these watersheds would have included floods, landslides, and fires (Figure 3-5). Vigorous firefighting efforts by the Forest Service have reduced the role of fire as a disturbance agent in recent years, as most fires have been contained at very few acres (Table 3-17). Comparing the total percent of the subwatershed in an ETA condition (Table 3-14) to the percent burned over the past 40 years (Table 3-17), it is clear that the majority of the disturbance has been from roads and timber harvest. These calculations do not account for some other possible disturbances, such as floods or landslides, but landslides are infrequent in the geology/landforms in this area. There have been channel re-arrangements following high spring runoff flows, but these seemed to have actually improved the aquatic habitat in most cases.

For this analysis, disturbance history is evaluated as Equivalent Treatment Acres (ETA), which is functionally equivalent to Equivalent Clear-cut Acres (ECA). This evaluation takes into account timber harvest, fire, road, and vegetative recovery from these disturbances. Table 3-14 gives these values for subwatersheds in the project area. Timber harvest data was not available for lands outside of the Forest boundary. Within the National Forest, all subwatersheds had less than 15% equivalent clear-cut acres. Historically, all of these subwatersheds have had some harvest inside of Pacfish RHCA's. Most of the harvest has been in the headwaters areas (Figure 3-4). Some such disturbance was years ago (Figure 3-4) and harvest units are in various stages of hydrologic recovery. Since ETA values are less than 15% for all four subwatersheds, they would be classified as *Properly Functioning.*

**Table 3-17 — Wildfire acreages by Subwatershed and Decade for Tollgate Project Area Subwatersheds[1]**

| Subwatershed (HUC) | 1972-1981 | | 1982-1991 | | 1992-2001 | | 2002-present | |
|---|---|---|---|---|---|---|---|---|
| | Acres Burned | % % of Sub-watershed | Acres Burned | % of Sub-watershed | Acres Burned | % of Sub-watershed | Acres Burned | % of Sub-watershed |
| Upper Lookingglass (HUC 170601041001) | 1.8 | .012 | 26.4 | .17 | 36.2 | .24 | 2 | .013 |
| Middle South Fork Walla Walla River (HUC 170701020102) | .6 | .003 | 2.1 | .012 | .7 | .004 | 2130 | 12 |
| North Fork Umatilla River (HUC 170701030104) | .7 | .003 | 2.3 | .012 | 2.4 | .012 | .5 | .003 |
| Bear Creek (Umatilla River below forks – HUC 170701030106)[5] | 1.1 | .005 | 32.3 | .16 | 1.8 | .009 | .1 | .0005 |

[1]Within National Forest boundaries

### Riparian Habitat Conservation Areas

In the past, timber has been harvested from inside of RHCAs in all project area subwatersheds. Most, but not all, of this harvest was over intermittent, non-fish-bearing headwater streams. Timber has not been harvested inside of RHCAs in Tollgate project subwatersheds since the effective date of the Pacfish Decision Notice in February of 1995.

The mainstem portions of the South Fork Walla Walla River, the North Fork of the Umatilla River, and Upper Lookingglass Creek are in designated Roadless and Wilderness areas and so their Riparian Reserves or Riparian Habitat Conservation Areas are protected and intact. Some of the headwaters and tributaries of these streams have adjacent roads and timber harvest from management activities prior to 1995, although even in these cases the older sites have partially or completely recovered. In any case, because of the topography of this area, most of the roads and management activities have been on the ridge tops and upper slopes and have left the streams and riparian areas mostly unmanaged. Best estimates by persons familiar with the project area put the riparian areas here at more than 90% intact, which would be considered *Properly Functioning*.

Mainstem Umatilla River in the Bear Creek Watershed has a valley bottom road which is inside of the RHCA and in some places closely approaches the stream, and so has had some effects such as reducing shade and woody debris recruitment. The RHCA area in this subwatershed should be considered as functioning *At Risk*.

The Umatilla NF Land and Resource Management Plan was amended by Pacfish in 1995. Prior to that time, some timber harvest units extended to some streams. Harvest history information and geographic information system (GIS) stream layers were used to estimate RHCA harvest for the analysis area. From the mid-1960s to the implementation of Pacfish , about 8% of the linear distance of RHCAs had harvest entries.

There are few roads within RCHAs relative to total miles of streams in the analysis area (Table 3-18) because past management activities were concentrated in accessible plateaus and not within steep canyon bottoms. The RHCAs of the analysis area are largely intact and subject to natural disturbance factors; insect and disease, flood, fire.

### Disturbance Regime

Not many natural disturbances to streams in the project subwatersheds have been documented. Those that have been observed (e.g., landslides and channel migration in Lookingglass Creek which added large wood to the stream and increased habitat complexity) have been short lived, and mostly beneficial.

Excepting the Middle South Fork Walla Walla, the dominant documented disturbances in these subwatersheds have been timber harvest and road building. The Burnt Cabin Fire in 2005 burned 1882acres in the Middle South Fork Walla Walla Subwatershed, and this dwarfed all other recent disturbances there. Without fire suppression, the natural fire regime would be mixed to high severity wildfires with long return intervals.

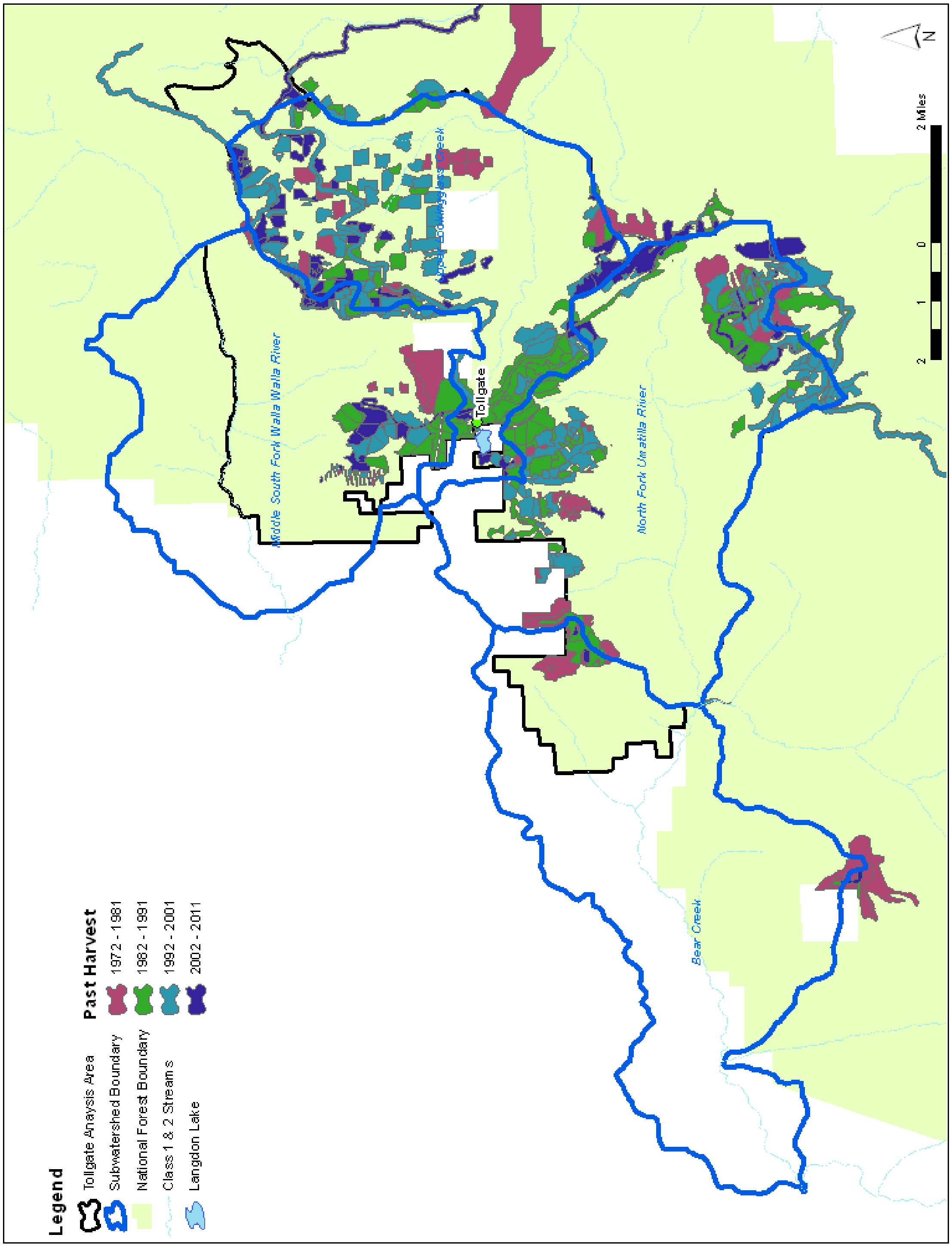


**Figure 3-4 — Timber harvest history in Tollgate Fuels project area subwatersheds**

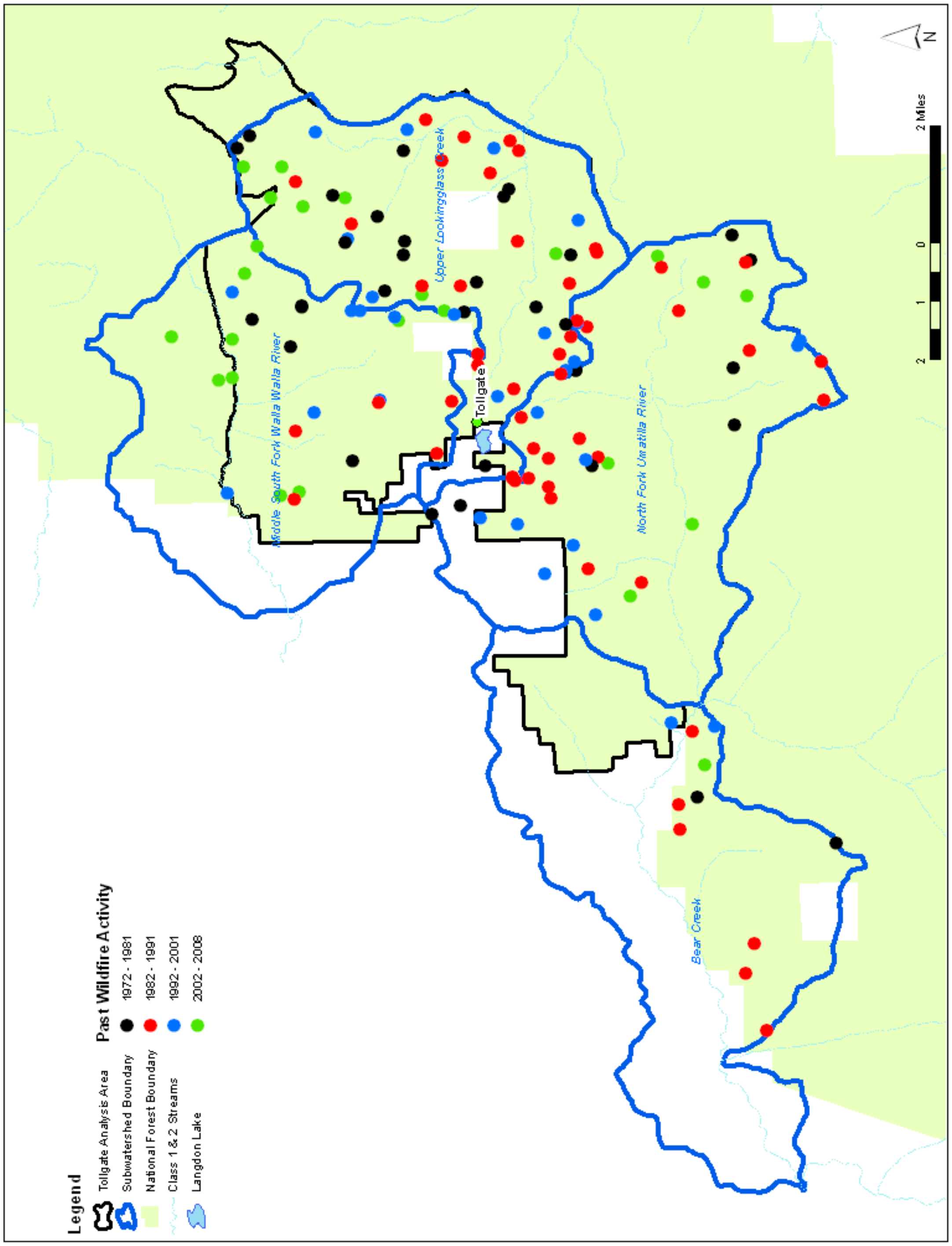


**Figure 3-5 — Locations of Past Fires by Decade in Tollgate project area subwatersheds**

**Table 3-18 — Road Density and Road Stream Interaction on NFS Lands**

| Subwatershed (SWS) # | SWS Name | Road Density Open & Closed Mi/mi. sq. | Road Miles w/in RHCAs | Miles of road per mile of Stream | Stream & Road Intersections (number of intersections) |
|---|---|---|---|---|---|
| 170601041001 | Upper Lookingglass Creek | 3.6 | 3.7 | .06 | 36 (Category 2 & 4) |
| 170701020102 | Middle South Fork Walla Walla River | 1.0 | 2 | .02 | 25 (Cat. 2 & 4) |
| 170701030104 | North Fork Umatilla River | 1.6 | 2.8 | .03 | 4 (Cat. 1)<br>25 (Cat. 2 & 4) |
| 170701030106 | Bear Creek | 0.5 | 1.2 | .02 | 5 (Cat. 1)<br>5 (Cat. 4) |

Clearly, fire suppression over many years in this area has altered the natural disturbance regime. Most fire starts in project area subwatersheds have been suppressed at a very small size, and show on maps as mere points (Figure 3-5). Thus fire is the natural disturbance process which deviates most from historic cycles.

Although extensive past timber harvest in parts of this area (Figure 3-4) may partially mimic wildfire, the effects are not the same (Rieman and Clayton 1997). Because roads are now long-term features of the landscape and timber management in the upper, cool-moist elevations are ongoing long-term operations, that maintain the vegetative environment in a somewhat non-natural condition, it would not be correct to state that environmental disturbances are short lived. However, the hydrograph is predictable, there is high quality aquatic habitat, watershed complexities provide refuge and rearing space for all life stages and multiple life history forms. Because conditions in these subwatersheds meet some, but not all of the criteria for properly functioning, all four of the project subwatersheds should be evaluated as *functioning at risk* for the disturbance regime parameter.

## Summary of Species and Habitat Conditions

Four ESA listed "Threatened" stocks of fish are found within the project's fisheries analysis area (Table 3-8). Their status as ESA Threatened identifies these stocks as at some risk of extinction, or at least extirpation from their range. The risk that these species may face is highlighted by the observation that two species of anadromous fish that formerly occupied nearby streams, coho and sockeye salmon, have been extirpated from the Grande Ronde River system within the last 100 years.

The major factors driving the extirpation of both sockeye and coho were over harvest, unscreened irrigation diversions, and misguided attempts at fish culture (Cramer and Witty, 1998), in which fish racks placed in the Wenaha and Grande Ronde Rivers a very short distance above the town of Troy, Oregon were used to capture all or nearly all Coho and sockeye attempting to ascend the river, in order to spawn them artificially.

The salmon, steelhead, and bull trout presently using the project area watersheds must also overcome a variety of challenges, both downstream of the project area and within the analysis area subwatersheds.

Downstream obstacles include dams, water withdrawals, high summer water temperatures, water contamination, and commercial, tribal, and sport fishing. The Lookingglass bull trout population also contains a migratory component, and migratory bull trout encounter some of the same stresses as do migrating anadromous fish. Most migrating fish arriving at the analysis area would have already encountered considerable stress, and it is important for their survival and successful reproduction, that conditions on National Forest provide habitat as free of non-natural stresses as feasible.

Conditions of the habitat in the analysis area subwatersheds have already been evaluated in this document, but the conclusions are summarized by habitat parameter in Table 3-19.

**Table 3-19 — Summary of Functional Condition[1, 2] of Aquatic Habitat Parameters for the Tollgate Fuels project area in Lookingglass, Walla Walla, Umatilla Watersheds Following USFWS and NOAA Fisheries Criteria for ESA Listed Fish Species**

| Parameter | Subwatersheds | | | |
|---|---|---|---|---|
| | Upper Lookingglass (HUC 170601041001) | North Fork Umatilla River (HUC 170701030104) | Middle South Fork Walla Walla River (HUC 170701020102) | Bear Creek (Umatilla River below forks – HUC 170701030106) |
| Water temperature | PF | PF | PF | AR |
| Suspended Sediment | PF | PF | PF | PF |
| Chemical contamination and nutrients | PF | PF | PF | PF |
| Physical barriers | PF | PF | PF | PF |
| Substrate | PF | PF | PF | PF |
| Large woody debris | PF | PF | PF | NPF |
| Pool frequency | PF | PF | PF | PF |
| Large pools | PF | PF | PF | PF |
| Off-channel habitat | PF | PF | PF | NPF |
| Refugia | AR | AR | AR | AR |
| Wetted width/depth | PF | PF | PF | PF |
| Streambank conditions | PF | PF | PF | PF |
| Floodplain connectivity | PF | PF | PF | AR |
| Change in peak or base flows | PF | PF | PF | PF |
| Increase in drainage network | PF | PF | PF | PF |
| Road density and location[3] | NPF | AR | AR | AR |
| Disturbance history | AR | AR | AR | AR |
| RHCA's | PF | PF | PF | AR |
| Disturbance regime | AR | AR | AR | AR |

[1]PF = functioning appropriately/properly functioning, AR = functioning at risk/at risk, NPF = functioning at unacceptable risk/not properly functioning, MS = Meets Oregon State Standards and is not occupied by ESA listed fish, Blank space = insufficient data.
[2]Where data for multiple years or sites are available, interpretations or averages applying best professional judgment were used. Rating may vary from year to year and between sites. See text.
[3]Based on limited data and/or cursory, personal observations.

Most habitat parameters in most subwatersheds were evaluated as Properly Functioning.

Some of the NPF conclusions are clearly the result of management activities, though. The high *road density & location* and *disturbance regime* are in this category. It will be important to pay special attention to effects of project activities on these parameters.

# FOREST VEGETATION - SILVICULTURE

## Scale of Analysis

### *Geographic Boundary*

The geographic context for estimating effects includes all lands located within the Tollgate planning area expected to be directly, indirectly, and/or cumulatively affected by implementation of an Alternative and/or other past, present or foreseeable future human activity. Silvicultural activities included in Alternative B would directly affect approximately 4,330 acres of the project planning area; silvicultural activities included in Alternative C would directly affect approximately 4,010 acres of the forest Affected Environment. Indirect and cumulative effects are expected to occur across the entire project planning area (approximately 37,566 acres).

### *Temporal Boundary*

The effects analysis is bounded in time by considering the present time, and how far into the past and future to consider human actions which have effects that would overlap in time with the proposed Tollgate project. The temporal context for evaluating effects includes past, present, and reasonably foreseeable actions in the planning area, as described below.

Past actions had an influence on existing (2011) conditions, which are described by a vegetation database developed for the planning area by using Most Similar Neighbor imputation procedures (Justice 2011), field reconnaissance, aerial photo interpretation, and analysis of stand examination data. Database information was validated by completing field reviews during 2008-2011. In addition to non-anthropogenic disturbances, existing conditions reflect vegetation changes resulting from fire suppression, timber harvest, fuelwood collection, tree planting and noncommercial thinning. The temporal bounding of past effects is the era when vegetation management and fire suppression began in the area.

Present (ongoing) actions were considered when evaluating effects. The main present action affecting forest vegetation conditions is the regular collection of firewood along designated road corridors, fire suppression activities, the occasional removal of dead hazard trees from developed recreation sites at Jubilee Lake Campground, Spout Springs Ski Area, and the Tollgate USFS administrative facilities.

Reasonably foreseeable actions were included in the effects analysis. Although the vegetation effects of implementing activities included under Alternatives B or C could persist for several years or even many decades, no other activities with direct or indirect effects occurring within the Tollgate forest Affected Environment are reasonably foreseeable beyond approximately five years in the future. In other words, a five-year timeframe was utilized to identify which future actions are reasonably expected to occur and have effects that overlap in space and time with the effects of the Tollgate Fuels Reduction Project. This is based the Umatilla National Forest utilization of a five-year timber action plan which identifies areas where the Forest is considering future vegetation management projects. Any activities that might occur at some future time beyond this planning timeframe are highly speculative and not included in this analysis.

# Affected Environment

This section describes how the entire planning area was pared down to just the portion considered for implementation of silvicultural activities, which is referred to as the "forest vegetation Affected Environment."[13] The process used to identify a forest vegetation Affected Environment considered biophysical factors, legal and administrative requirements such as the Forest Plan, and Forest Service directives and related policy (such as the Forest Service Manual and Handbook system, and official policy memoranda signed by a Forest Service line officer).

Four indicators are used to characterize the Affected Environment: potential vegetation, species composition, forest structural stages, and tree density. When estimating the environmental consequences of implementing the action Alternatives, only three of the indicators are used (species composition, forest structural stages, and tree density) because the fourth indicator (potential vegetation) is not modified by Alternative implementation (i.e., potential vegetation is not changed by implementing silvicultural activities). One of the indicators (potential vegetation) is also used for stratification purposes because potential vegetation is used to establish biophysical environments, biophysical environments are used when conducting historical range of variability (HRV) analyses, and HRV is used when analyzing the composition, structure, and density indicators.

In addition to the indicators described above, the Affected Environment and predicted Environmental Consequences are also characterized in general terms of forest susceptibility to insect and disease disturbances. Furthermore, historical natural ecological analogs, vegetation conditions, disturbance regimes, and ecological consequences to the proposed action were are described in a 2008 site visit report by the USDA Forest service Region 6 Ecologist, included in Appendix D.

## *Potential Vegetation*

The potential vegetation of the forest vegetation Affected Environment is characterized using potential vegetation groups (PVG), a higher-level taxonomic unit in a hierarchy of potential vegetation types (Powell et al. 2007). PVGs are named for a predominant or controlling temperature or moisture relationship.

Forest understory species include a diverse mix of forbs and shrubs. Other common understory species include big huckleberry (*Vaccinium membranaceum*), honeysuckle (*Lonicera involucrata*), prince's pine (*Chimaphila umbellata*), trailplant (*Adenocaulon bicolor*), sitka valerian (*Valeriana sitchensis*), Jacob's ladder (*Polemonium pulcherrimum*), golden pea (*Thermopsis montana*), starry false Solomon's seal (*Smilacina stellata*), and many others. Present understory species thrive in this environment of abundant moisture, deep well-aerated soils, and partial shade.

Table 3-20 summarizes and Figure 3-6 shows the PVG composition of the forest vegetation Affected Environment (comprising 37,566 acres in total). It shows that the predominant PVG is moist upland forest (95%), followed by dry upland forest (4%). Very little of the forest vegetation Affected Environment consists of the cold upland forest PVG (less than 1%).

[13] Acreage figures reported in this section (and elsewhere in this report) are rounded to the nearest 1 acre, and considered approximate as a result of occasional calculation rounding errors.

**Table 3-20 — Potential vegetation groups for the Project Planning Area**

| PVG Code | Potential Vegetation Group Description | Acres | Percent of Total |
|---|---|---|---|
| Cold UF | Cold Upland Forest | 277 | <1 |
| Dry UF | Dry Upland Forest | 1,574 | 4 |
| Moist UF | Moist Upland Forest | 35,715 | 95 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS lands only).

## *Species Composition*

Table 3-21 summarizes existing species composition (forest cover types) for the forest vegetation environment. It shows that the predominant forest cover type is grand fir (28%), followed by spruce-fir (26%) and Douglas-fir (26%), and lodgepole pine (9%).

An HRV analysis was completed for species composition of the forest vegetation. Because species composition varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. The cold upland forest PVG was not included because it has too few acres (277 acres) for a credible HRV analysis. Species composition HRV results are presented in Table 3-22.

**Table 3-21 — Cover types for the Tollgate Fuels Reduction Project Area**

| Code | Cover Type Description | Acres | % of Total | % of Forested |
|---|---|---|---|---|
| Non-vegetated | Non-forest cover types (rocky, water, administrative sites, etc.) lacking extensive vegetation cover. | 301 | <1 | |
| Herb-shrub | Non-forest cover types dominated by herbaceous and shrub species | 8591 | 18 | |
| Ponderosa pine | Forest with ponderosa pine as the majority or plurality species | 2465 | 5 | 7 |
| Douglas-fir | Forest with Douglas-fir as the majority or plurality species | 9885 | 21 | 26 |
| Western larch | Forest with western larch as the majority or plurality species | 1045 | 2 | 3 |
| Lodgepole pine | Forest with lodgepole pine as the majority or plurality species | 3269 | 7 | 9 |
| Hardwoods | Forest with various hardwoods the majority or plurality species | 578 | 1 | 2 |

| | | | | |
|---|---|---|---|---|
| Grand fir | Forest with grand fir as the majority or plurality species | 10416 | 22 | 28 |
| Subalpine fir-Engelmann spruce | Forest with subalpine fir and/or Engelmann spruce as the majority or plurality species | 9907 | 21 | 26 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (NFS lands only). The subalpine fir-Engelmann spruce cover type contains either a majority or plurality of either species, alone or in combination.

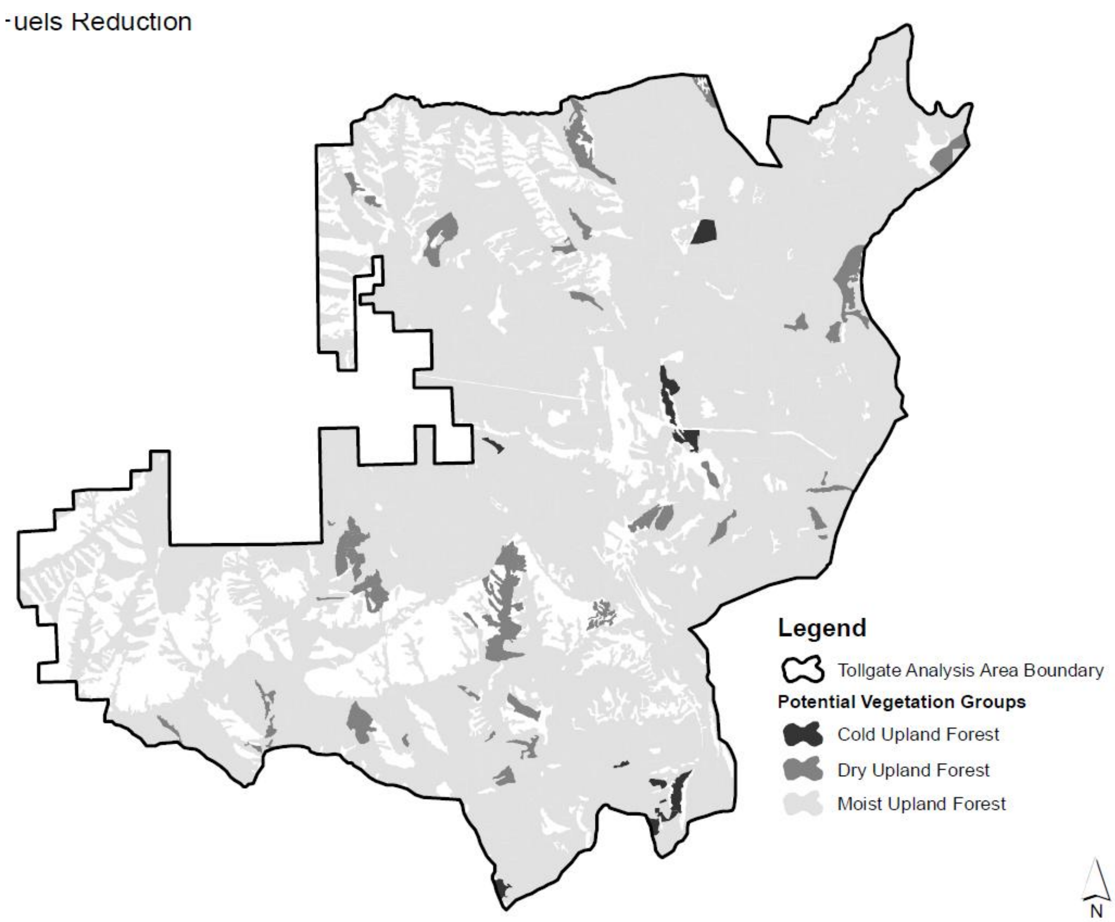


**Figure 3-6 — Upland forest potential vegetation groups for the Tollgate planning area.**

**Table 3-22 — HRV analysis of species composition**

| Cover Type | Dry Upland Forest PVG | | | | Moist Upland Forest PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Current Amount | | Historical Range | | Current Amount | |
| | % | Acres | % | Acres | % | Acres | % | Acres |
| Western juniper | 0-5 | 0-1786 | 0 | 0 | | | | |
| Ponderosa pine | 50-80 | 787-1259 | 51 | 800 | 5-15 | 1786-5357 | 5 | 1665 |
| Douglas-fir | 5-20 | 79-315 | 21 | 326 | 15-30 | 5357-10715 | 27 | 9559 |
| Western larch | 1-10 | 16-157 | 0 | 0 | 10-30 | 3572-10715 | 3 | 1045 |
| Lodgepole pine | | | | | 25-45 | 8929-16072 | 9 | 3196 |
| Broadleaved trees / hardwoods | 0-5 | 0-79 | 0 | 0 | 1-10 | 357-3572 | 2 | 578 |
| Grand fir | 1-10 | 16-157 | 28 | 448 | 15-30 | 5357-10715 | 28 | 9968 |
| Subalpine fir-Engelmann spruce | | | | | 1-10 | 357-3572 | 27 | 9704 |

*Sources/Notes:* Current amounts are summarized from the Tollgate vegetation database (forested NFS lands only). Gray shading indicates cover types that are either above or below the historical range of variability. Historical ranges were adapted by the author of this report from Morgan and Parsons (2001); they are based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regimes and summarized by Martin (2010) and Powell (2010b).

The information presented in Table 3-22 suggests that dry forestland currently supports too much of the grand fir and Douglas-fir forest cover types, and too little of the western larch forest cover type. Moist forestland supports too much of the subalpine fir-Engelmann spruce forest cover types, and too little of the western larch and lodgepole pine forest cover types.

### *Forest Structural Stages*

Table 3-23 summarizes existing forest structural stages for the forest vegetation Affected Environment. It shows that the predominant forest structural stage is Old Forest Single Stratum (34% of the Affected Environment, OFSS), followed by Old Forest Multi Strata (31%, OFMS), Stand Initiation (21%, SI), Stem Exclusion (8%, SE), and Understory Reinitiation (6%, UR). OF structure classes, by definition, contain 10 or more live conifer trees per acre greater than or equal to 21" diameter at breast height (DBH).

**Table 3-23 — Forest structural stages**

| Code | Forest Structural Stage Name | Acres | Percent of Total | Percent of Forested |
|---|---|---|---|---|
| SI | Stand Initiation | 2176 | 17 | 21 |
| SE | Stem Exclusion | 3184 | 7 | 8 |
| UR | Understory Reinitiation | 7746 | 5 | 6 |
| OFMS | Old Forest Multi Strata | 11600 | 25 | 31 |
| OFSS | Old Forest Single Stratum | 12859 | 28 | 34 |
| NF | Non-forest | 8892 | 20 | |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS lands only). Forest structural stages are described in O'Hara et al. (1996).

An HRV analysis was completed for forest structural stages of the existing condition of forest vegetation. Because forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (277 acres) for a credible HRV analysis. Forest structural stage HRV results are presented in Table 3-24.

The information presented in Table 3-24 suggests that the SE and OFMS structural stages are outside of their historical ranges for the dry upland forest PVG, and that all structural stages are outside of respective historical ranges for the moist upland forest PVG.

**Table 3-24 — HRV analysis of forest structural stages for the Affected Environment**

| Structural Stage | Dry Upland Forest PVG | | | | Moist Upland Forest PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Current Amount | | Historical Range | | Current Amount | |
| | % | Acres | % | Acres | % | Acres | % | Acres |
| SI | 15-25 | 236-394 | 17 | 260 | 20-30 | 7143-10715 | 5 | 1894 |
| SE | 10-20 | 157-315 | <1 | 7 | 20-30 | 7143-10715 | 9 | 3177 |
| UR | 5-10 | 79-157 | 9 | 141 | 10-20 | 3572-7143 | 21 | 7477 |
| OFMS | 5-15 | 79-236 | 31 | 487 | 15-20 | 5357-7143 | 31 | 11095 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| OFSS | 40-60 | 630-944 | 43 | 678 | 10-20 | 3572-7143 | 34 | 12072 |

*Sources/Notes:* Summarized from the Tollgate vegetation database (forested NFS lands only). Gray shading indicates structural stages that are above or below the historical range of variability. Historical percentages (H%) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Martin (2010) and Powell (2010b).

### *Tree Density*

Table 3-25 summarizes existing tree density classes for the project planning area. It shows that the predominant tree density class is High (76%), followed Moderate (15%) and then by Low (9%).

**Table 3-25 — Tree density classes**

| Tree Density Category | Acres | Percent of Forested |
|---|---|---|
| Low | 3356 | 9 |
| Moderate | 5548 | 15 |
| High | 28662 | 76 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS lands only). Criteria for assigning polygons to tree density classes are provided in Powell (2009c).

An HRV analysis was completed for tree density classes. Tree density HRV results are presented in Table 3-26.

The information presented in Table 3-26 suggests that the dry upland forest PVG has too little of the Low density class and too much of the High density condition. For the Moist upland forest all three density classes are outside their historical ranges of variability.

**Table 3-26 — HRV analysis of tree density classes**

| Tree Density Class | Dry Upland Forest PVG | | | | Moist Upland Forest PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Current Amount | | Historical Range | | Current Amount | |
| | % | Acres | % | Acres | % | Acres | % | Acres |
| Low | 40-85 | 630-1338 | 5 | 83 | 20-40 | 7143-14286 | 9 | 3221 |
| Moderate | 15-30 | 236-472 | 30 | 466 | 25-60 | 8929-21429 | 14 | 5077 |
| High | 5-15 | 79-236 | 65 | 1025 | 15-30 | 5357-10715 | 77 | 27417 |

*Sources/Notes:* Summarized from the Tollgate vegetation database (forested NFS lands only). Gray shading indicates tree density classes that are above or below the historical range of variability. Historical ranges were taken from Schmitt and Powell (2008). Tree density classes are defined as: Low, <45% crown closure; Moderate, 45-55% crown closure, and; High, >55% crown closure.

## Risk/Susceptibility to Insect and Disease Disturbances

Disturbance processes influence forest composition, structure and density (Perera et al. 2004). Although many different disturbance processes have influenced vegetation conditions in the Tollgate area to varying degrees in the recent past, forest insects have been important as disturbance agents.

Information provided by the Pacific Northwest Region's aerial survey program was used to partially assess recent impacts from forest insects. Aerial detection sketch maps for a 5-year period (2006-2010) were used to summarize the annual spatial extent of recent activity for bark beetles, the balsam wooly adelgid, larch casebearer, and larch needle cast.

Damage from Douglas-fir bark beetles was somewhat widespread across portions of the Tollgate planning area since 2006, but no damage was observed in 2010. Very small pockets of damage caused by the mountain pine beetle in ponderosa pine were noted at minor, endemic levels in 2010 only. Similarly, incidental fir engraver effects were noted at minor, endemic levels in two isolated polygons in 2010. Unsurprisingly, balsam wooly adelgid effects were consistently observed across large, patchy portions of the planning area throughout the 2006-2010 time period, reflecting the ubiquitous, significant, yet slow-acting mortality caused by this insect among subalpine fir. Larch casebearer damage was observed every year across significant portions of the planning area, but by 2010 was only noted in two relatively small, isolated polygons. Larch needle cast was noted only in 2010, occurring in eight isolated pockets. But in the late 1940s and early 1950s, and then again in the 1980s, western spruce budworm was defoliating substantial acreages of mixed-conifer forest throughout the Blue Mountains, and we can expect another widespread outbreak of this forest insect in the near future.

Susceptibility is defined as a set of conditions that make a forest stand vulnerable to substantial injury by insects or diseases. Susceptibility assessments do not predict when insects and diseases might reach damaging levels; rather, they indicate whether stand conditions are conducive to declining forest health and increasing levels of tree mortality caused by insect and disease organisms. Drought, ecological site potential (potential vegetation type), species composition and abundance, tree size, forest structure (canopy layering; structure class), stocking (tree density), intra-stand variability (clumpiness), and other biophysical factors influence susceptibility and vulnerability to insect and disease disturbances (Hessburg et al. 1999b, Lehmkuhl et al. 1994, Schmitt and Powell 2005).

Within the context of forest insect disturbances, the term "risk" is often used to indicate the likelihood or probability that an event (in this case, insect damage) will occur, and the probable damage severity. Risk depends on both stand susceptibility ("hazard") and insect population densities. Given the localized and/or low-severity levels of recent insect activity, overall vulnerability/risk to significant insect damage across the planning area is not as high as it has been at other times in the past; however, stand susceptibility to various damage agents is generally elevated as a result of high stand densities and other factors (particularly canopy layering), and there is little reason to doubt that past insect epidemics occurring historically in the Blue Mountains would not be repeated in the Tollgate area.

In October of 2011, a staff from the USDA Forest Service Blue Mountains Pest Management Service Center walked through portions of three stands in the proposed project area, with the objective to: determine historic and current insect and disease activity, and causal agents of disturbance; determine the risk of future disturbance, and the probable effect of deferred treatment.

General levels of susceptibility to root disease can be assessed using vegetation structure and composition data (Schmitt and Powell 2005). Across the Tollgate forest Affected Environment approximately 80 % of the forested cover types are dominated by either grand fir, Douglas-fir, or a spruce-subalpine fir mix, usually distributed among two or more canopy layers. Average stem diameter for the dominant overstory exceeds 9” DBH across large portions of the planning area. As a result, approximately 50-75% of the planning area is estimated to be rated as having high potential for root disease.

# FUELS

## Scale of Analysis

Indicators used to summarize the affected environment are tree stand densities and canopy biomass levels represented by crown fire potential, surface fire, spotting potential, and fire travel times.

Project activities, in conjunction with past, ongoing, and reasonably foreseeable activities have effects on fuels and fuel continuity; therefore, the project area is sufficient to display effects on the landscape.

## Analysis Methodology and Sources of Information

### *Vegetation and Past Disturbance*

Stand exam data, Landfire data, and Most Similar Neighbor (MSN) vegetation data was used to model stand and landscape vegetation conditions. Historical fire occurrence data was obtained from written records on file with Dave Powell, Forest Silviculturist, and Umatilla National Forest geographic information system (GIS) database.

### *Fire Regimes and Condition Class*

Fire regimes and condition class were derived from Countryman (2006); fire regimes described therein were mapped at the Forest level using potential vegetation groups (PVG) and ecoclass. Condition class was mapped using biophysical settings. Departure values at 30 percent or greater for condition class 1 were classified as condition class 2 for this analysis.

### *Crown Fire Potential*

Stand examination survey information was summarized using the Blue Mountain variant of the Forest Vegetation Simulator (FVS). FVS provided estimates for after-treatment canopy fuel conditions (i.e. crown base height and canopy bulk density) in forest stands within the project. Post treatment canopy cover was estimated and informed by FVS. Surface fire behavior and pre-treatment canopy conditions were derived from LANDFIRE National data for the original standard 13 fire behavior prediction system fuel models. The Changes in canopy and surface fuels were applied to LANDFIRE data using the landscape calculator in the FARSITE fire behavior software.

Weather used to estimate fire behavior was taken from Case RAWS. Approximated 90$^{th}$ percentile conditions[14] were used for modeling. Gridded winds generated using Wind Ninja were used in modeling. The wind conditions modeled were 15 mph winds out of the southwest. Topography in the simulations was a 30-meter digital elevation model (DEM). All of this information was prepared for analysis of untreated and treated conditions in a landscape file prepared for use in FlamMap.

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[14] 90$^{th}$ percentile weather conditions are represented by 5% 1 hour fuel moistures, 60% live fuel moistures, and 15 mph 20 ft. windspeeds. 10% of fire-season weather days are represented by these weather conditions or drier.

### *Limitations*

All assumptions previously published regarding the Behave fire spread model (Rothermel 1972) apply to these simulations because it is the model used to estimate surface fire spread parameters for each pixel in the landscape file grid. Calculation methods for crown fire initiation and spread rates are published in a scientific paper by Scott and Reinhardt in 2001. The minimum travel time algorithm was developed and published by Mark Finney in 2002. All simulation excludes the influence of fire suppression operations. Site specific impacts such as probability that a structure on private property would or would not be damaged in an actual wildfire incident are not estimated. Data on current fuel loadings was not always available. Fuel loadings predicted by the model generally underestimated current conditions. Where the existing fuel model deviated from a fuel model 8, it was assumed that it would become a fuel model 8 after treatment.

This analysis addresses the effects of implementing the proposed alternatives for the Tollgate project area in relation to "Modify fire Behavior" within the wildland urban interface. Modified fire behavior was analyzed in terms of fire behavior potential.

The key indicators used to compare the alternatives were:

1. Crown fire potential – quantified as either surface fire, passive crown fire, or active crown fire.
2. Fire travel time – quantified as elapsed time for fire to travel a given distance.
3. Fire Intensity – quantified in Flame Length
4. Spotting Distance – quantified in probabilistic distance for spots to occur from a given fire source
5. Treatment adjacency to private land – quantified as treatment acreage within ¼ of private land and infrastructure.

## Affected Environment

### *Fire Regimes*

A fire regime is a classification of the historical role fire would play across a landscape, and describes the historical fire conditions under which vegetative communities evolved and are maintained (Agee 1993). Coarse scale definitions for historical fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002). Fire regimes are classified based on the average number of years between fires combined with the severity of the fire (Table 3-27). Four historical fire regimes commonly occur in the Blue Mountains (Powell 2005). Fire Regimes I, II, III, and IV are represented in the Tollgate project planning area and are described in Table 3-27 below.

**Table 3-27 — Descriptions of Fire Regimes**

| Fire Regime Group | Vegetation Types | Frequency (Fire Return Interval) | Severity |
|---|---|---|---|
| 1 | All ponderosa pine types; Dry-Douglas fir/pine grass; and grand fir/grass | 0-35 years | Low severity |
| 2 | True grasslands | 0-35 years | Stand replacing |
| 3 | 3a - Mixed Conifer, dry Douglas fir, dry grand fir | 3a - <50 years | Mixed Severity |

| | | | |
|---|---|---|---|
| | 3b – Warm, mesic grand fir<br>3c – Mesic grand fir and Douglas fir | 3b – 50-100 years<br>3c – 100-200 years | |
| 4 | 4a – Lodgepole pine<br>4b – Subalpine fir<br>4c – Spruce fir; western larch; western white pine. | 4a – 35-100+ years<br>4b – 100+ years<br>4c – 100-200 years | 4a – stand replacing<br>4b – stand replacing, patchy arrangement<br>4c – stand replacing |
| 5 | Mountain hemlock | Greater than 200 years | Stand replacing |

## *Condition Class (CC)*

Fire Regime Condition Class (FRCC) is a descriptor used to characterize an areas departure from historical fire regimes (Powell 2002). There are three condition classes for each fire regime and they are based on the degree of departure from the historical regimes. This departure results in changes to vegetation characteristics such as species composition (structural stages, stand age, and canopy closure), fuel composition, fire frequency and severity, and other disturbances such as insect and disease. Condition class 1, low departure, is considered to be within the historical range, while moderate condition class 2, and high, condition class 3, are outside the historical range (see Table 3-28).

**Table 3-28 — Descriptions of Fire Regime Condition Class**

| Condition Class | Description | Species Composition and Structure |
|---|---|---|
| 1 | Within the historical range of variability of the vegetation characteristics; fuel composition; fire frequency, severity and pattern | Species composition and structure are functioning within their historical range. |
| 2 | Fire regimes have been moderately altered from historical range. Fire frequencies by one or more return intervals. The result is moderate changes to one or more of the following; fire size, intensity and severity, and landscape patterns. | Species composition and structure have been moderately altered. For example:<br><br>Grassland – moderate encroachment of shrubs and trees or invasive exotic species.<br><br>Forestland - Moderate increase in density, encroachment of shade tolerant tree species. |

| | | |
|---|---|---|
| 3 | Fire regimes have been substantially altered from their historical range. Fire frequencies have departed from natural frequencies by multiple return intervals. Dramatic changes occur to one or more of the following: fire size, intensity and severity, and landscape patterns. | Species composition and structure have been substantially altered from their historical range. For example:<br><br>Grassland – High encroachment and establishment of shrubs, trees, or invasive exotic species.<br><br>Forestland – High increases in density, encroachment of shade tolerant tree species, or high loss of fire tolerant tree species.<br><br>High mortality of defoliation from disease and insect. |

### Fire Regime Condition Class Summary

The analysis and review of Fire Regime Condition Class for the Tollgate planning area illuminates some important features of the project as follows, and as described in Table 3-29:

**Table 3-29 — Tollgate Planning Area Fire Regime/Condition Class Summary**

| Biophysical Setting | Fire Regime | Condition Class 1 (Acres) | Condition Class 2 (Acres) | Condition Class 3 (Acres) | Total Acres |
|---|---|---|---|---|---|
| Mixed Conifer-Eastside Dry | I | 82 | 231 | 1,047 | 1,360 |
| Idaho Fescue Grasslands | II | 0 | 8,612 | 0 | 8,612 |
| Mixed Conifer-Eastside Mesic | III | 3,427 | 21,050 | 0 | 24,447 |
| Spruce-Fir | IV | 1,088 | 3,264 | 6,527 | 10,879 |
| **Total Acres** | | 4,596 | 33,157 | 7,574 | 45,328 |

- Fire Regime one and two are present in the planning area, but are located in the inaccessible canyons surrounding the plateau. As such, activities would not occur within these fire regimes.
- Areas defined as Fire Regime one, Condition Class three would not receive treatment as the inaccessible locations of these areas makes entry prohibitive. Typically, fuels activities are targeted at these areas, as the best available science demonstrates that activities within these

severely departed stands would result in beneficial ecological restoration; furthermore, upon initial entries into these ecotypes, maintenance can be efficiently and cost-effectively achieved through the application of low intensity prescribed fire. Given the project objective of protecting values on the plateau, treatment in these stands (while ecologically beneficial) would not occur as it does not meet the purpose and need.

- Atop the plateau where activities would occur within the planning area, existing vegetation is largely defined as Fire Regime four, Condition Classes two and three. Small areas of Fire Regime three, Condition Class two are also present within some treatment areas.

Fire Regime four and mesic Fire Regime three typically have long fire return intervals and historically would have burned with mixed to high severity. The stands proposed for treatment (all Fire Regimes four and three) are largely moderately, to severely departed from historic structural values.

## *Existing Fire Hazard and Fire Behavior*

### Surface Fuel Loading

Surface fuel loadings vary throughout the project area. Fuel models contained within the proposed areas are described by Anderson (1982). The difference in fire behavior among fuel models is related to the fuel load and its distribution among the fuel particle size classes (Anderson 1982). Fuel load and depth are significant fuel properties for predicting whether a fire will be ignited, rate of spread and intensity (Anderson 1982). Fuel models do not indicate potential for uncharacteristic wildfire behavior and effects, fire regime condition class, or departure from historical conditions. However, the combination of an indicator of departure from historical conditions, along with fuel models, can be of considerable value in determining if wildfire behavior and effects have departed from natural conditions (Hahn and Strohm 2003). Intensity and duration of surface fires depend on the availability and condition of surface fuels (Graham 2004). In terms of fuels and fire potential, a majority of the closed stands proposed for commercial harvest treatment have fuel loads that are best represented as fuel model 10.

A brief introduction to fuel models is located below and summarized in Table 3-30:

**Fire Behavior for Fuel Model 1(Short Grass)**: Fire spread is driven by fine, continuous herbaceous fuels. Fires in this model tend to be surface fires that move rapidly through cured grass.

**Fire Behavior for Fuel Model 2 (Short Grass):** Fire spread is primarily through the fine herbaceous fuels, either curing or dead. These are the surface fires where the herbaceous material, in addition to litter and dead-down stemwood from the open shrub or timber overstory, contribute to the fire intensity. Open shrub lands and pine stands or scrub oak stands that cover one-third to two-thirds of the area may generally fit this model; such stands may include clumps of fuels that generate higher intensities and that may produce firebrands.

**Fire Behavior for Fuel Model 5 (Low Brush)**: Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally less intense because surface fuel loads are light. Surface fuel loading, less than 3 inches in diameter, averages 3.5 tons per acre. Surface fuel bed depth averages 2 feet.

**Fire Behavior for Fuel Model 8 (Timber, Closed Timber Litter)**: Fire characteristics in this model tends to be slow-burning ground fires in compact litter with low flame lengths that may encounter an occasional heavy fuel concentration that can flare up. Only under severe weather conditions (i.e. high temperatures, low humidities, high winds) do these fuels generally become fire hazards.

**Fire Behavior for Fuel Model 9 (Timber, Open Timber Litter):** Fires run through the surface litter faster than model 8 and have longer flame height. Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Closed stands of long-needled pine like ponderosa, Jeffrey, and red pines or southern pine plantations are grouped in this model. Concentrations of dead-down woody material would contribute to possible torching out of trees, spotting, and crowning.

**Fire Behavior for Fuel Model 10 (Timber, Litter and Understory,** Figure 3-7**)**: Heavy concentrations of dead down fuels result in fires that burn with greater intensities than other timber/litter fuel models. Distinctive fire characteristics include passive crown fire, active crown fire, and spotting thus leading to potential fire control difficulties. Any forest type may be considered for this fuel model if heavy down material is present.

**Figure 3-7 — Photograph of Fuel Model 10**

**Table 3-30 — Fuel Models acres by Alternatives in Tollgate Fuels Reduction Project**

| Fuel Model | Alternative B Acres | Alternative C Acres |
|---|---|---|
| 1 | 27 | 25 |
| 2 | 367 | 347 |
| 5 | 3 | 3 |
| 8 | 425 | 385 |
| 9 | 1 | 0.4 |
| 10 | 3418 | 3159 |
| 91 (Non-forest, roads, structures) | 74 | 74 |
| 93 (Agricultural) | 14 | 14 |

As illustrated in Table 3-30, treatment units are primarily located in fuel model 10 and would be converted to fuel model 8 upon treatment. Some fuel model 8 and fuel model 2 exist within treatment units, and fuelbed conversion would not occur in these as a result of treatment. Fuel models 2 and 8 do not pose undue fire risk to values on the plateau, and thus are not targeted for treatment based on fuel model classification. Areas described as fuel models 2 and 8 are receiving treatment either based on canopy characteristics, or are small interior portions of a larger area classified as fuel model 10.

#### Crown Fire Potential

The spatial continuity and density of tree canopies in combination with wind and physical setting provide the conditions for crown fires (Graham 2004). Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire (Albini 1976, Rothermel 1991). Canopy base height is important because it effects crown fire initiation and canopy continuity influences the spread of fire (Graham 2004).

Ladder fuels, as they relate to canopy base height, provide avenues for fire to move from the ground to the tree crowns. Stands with low canopy base height are more susceptible to crown fires. Crown fires are high intensity wildfires that advance through forest canopy and can exhibit extreme fire behavior that is difficult and dangerous to suppress, and cause economic damage (Keyes and O'Hara, 2002). They occur when surface fires create enough energy to preheat and combust live fuels well above the ground or when ladder fuels, in the form of small seedlings, saplings and young trees with low hanging branches, carry fire into the upper canopy. There are two stages of crown fires: the initiation of crown fire activity, referred to as "torching" (also known as passive crown fire), and the process of active crown fire spread, where fire moves from tree crown to tree crown (Agee, 2005). Torching commences when the surface flame length exceeds a critical threshold, defined by Van Wagner (1977) as a function of the moisture content of overstory foliage and the vertical distance to live crown, known as canopy base height (CBH). Once in the crowns, fire must maintain a minimum rate of spread to become an active crown fire and is primarily determined by topography and weather conditions. The spread rate required to keep fire in the crowns hinges on the density of fuels in the canopy, called canopy bulk density (CBD) (Keyes and O'Hara, 2002). Torching and crowning also create firebrands that can spread fire well beyond their source, increasing fire spread to adjacent stands. Crowning significantly limits fire suppression options, requiring suppression personnel to rely on aerial resources or implement other indirect attack techniques.

# THREATENED, ENDANGERED, AND/OR SENSITIVE PLANTS

## Scale of Analysis

The scale of analysis for threatened, endangered and sensitive (TES) plant species is the Tollgate Fuels Reduction planning area within the Upper Umatilla, Upper Walla Walla River, and Lookingglass Creek watersheds.

### *Geographic Boundary*

The geographic scale of analysis for cumulative effects to Region 6 listed TES species is the Tollgate Fuels Reduction planning area.

### Temporal Boundary

The temporal scale begins with the first European settlers in the area and in this case begins with the history of grazing beginning in the mid 1800's. The other end of the temporal scale is approximately 10 years into the future or 2021, based on the knowledge of proposed projects. See Chapter 3 in the Tollgate Fuels Reduction EIS for a complete listing of all 'past, present, and reasonably foreseeable future actions'.

## Affected Environment

### Federally listed plant species: Spalding's catchfly

*Silene spaldingii*, Spalding's catchfly, is federally listed as threatened and known to occur on the Umatilla and Wallowa-Whitman National Forests. This plant occurs primarily in open grasslands with deep Palousian soils and is located approximately 40 aerial miles north and east of the Tollgate Fuels Reduction planning area. There are no documented occurrences of this plant in the project area and there is no habitat for this plant species in the Tollgate Fuels Reduction project area.

A pre-field review of Forest data in the Natural Resource Inventory System Threatened Endangered Sensitive Proposed/Invasive Plant (NRIS TESP/IP) database, both survey data and sensitive plant location data, as well as the sensitive plant list for the Umatilla National Forest in Oregon state both documented and suspected, revealed a list of 8 sensitive and 4 strategic taxa existing in the Tollgate Fuels Reduction project area. These species, both vascular and nonvascular, are listed below in Table 3-31 and Table 3-32.

Strategic, is a new category of species established on May 3, 2007, and strategic species are not considered 'sensitive' species under Forest Service Manual (FSM) 2670. They include species that have information gaps (i.e. distribution, habitat, threats) resulting in status or taxonomic uncertainties. The management requirement for this group of species is to record survey and location information in the NRIS TESP/IP database. Management of known sites located during surveys is not required for any Strategic species; however management of sites found for species that are Strategic only because they were suspected on FS or BLM land is recommended since they will be listed as Sensitive in the next list update. This direction is found in the official release letter from the Regional Forester dated January 31, 2008 which accompanied the latest iteration of the RFSSL. Western moonwort and the three strategic nonvascular taxa all strategic in Oregon, will not be managed for and will not be included in effects analysis for the Tollgate Project.

**Table 3-31 — TES vascular plants in the Tollgate project planning area**

| **Scientific name** | **Plant code** | **Common name** | **Status** |
|---|---|---|---|
| *Botrychium minganense* | BOMI | gray moonwort | OR - S |
| *Botrychium montanum* | BOMO | mountain grape-fern | OR - S |
| *Botrychium paradoxum* | BOPA | two-spiked moonwort | S |
| *Botrychium penduncculosum* | BOPE | stalked moonwort | S |

| | | | |
|---|---|---|---|
| *Carex cordillerana* | CACO81 | cordilleran sedge | OR - S |
| *Salix farriae* | SAFA | Farr’s willow | OR - S |

*OR - S = RFSSL listed as sensitive in Oregon state; S = RFSSL listed as sensitive in both Oregon and Washington.

**Table 3-32 — TES nonvascular taxa in the project area**

| Scientific name | Plant code | Common name | Status |
|---|---|---|---|
| *Chaenotheca subroscida* | CHSU14 | needle lichen | S |
| *Rhizomnium nudum* | RHNU | naked rhizomnium moss | OR – S |

*OR - S = RFSSL listed as sensitive in Oregon state; S = RFFSL listed as sensitive in both Oregon and Washington.

Prior to 2010, eighty-six botanical inventory surveys intersecting with the Tollgate project area were completed and are recorded in the NRIS TESP/IP database. These surveys date back to 1990, with more recent surveys in 2006 and 2009. After reviewing the surveys already documented in the project area; additional complete inventory botanical surveys were implemented west of Target Meadows and south of Langdon Lake in 2010.

### Botrychium species

The four R6 listed sensitive *Botrychium* species (*minganense, montanum, paradoxum* and *pedunculosum*) documented in the Tollgate project area are listed in Table 3-31 above. The following information about their life history and habitat is summarized from the Conservation Assessment for 13 Species of Moonworts (Ahlenslager and Potash, 2007). The information is enhanced with local knowledge of botanists sharing their observations in the Blue Mountains on the Umatilla National Forest.

*Botrychiums*, also known as moonworts or as grapeferns (due to the clusters of fruiting structures at the top of their stalks), are small, primitive plants closely related to ferns. They reproduce by spores, and are known to be mycorrhizal, though many details of their life history and growth requirements are still unknown. Although green and apparently photosynthetic, the species considered here are all capable of surviving for years with only sporadic above-ground growth, apparently drawing reserves from the host plants with which they have mycorrhizal connections. As a result, populations of these moonworts appear to fluctuate from year to year, depending on how many plants produce visible leaves and/or fruiting bodies. The factors determining yearly growth are not yet understood.

Preferred habitat of these species is perennially moist ground at the edges of small streams, wet meadows, springs, and seepy openings in forest. The plants often favor shade from an overstory of conifers and/or riparian shrubs such as alder and red-osier dogwood, but also occur in openings or meadows with only grasses and forbs providing shade. Wet meadow edges with encroaching lodgepole pine are prime grapefern sites, as are the mossy openings around springs in mixed conifer forest that includes subalpine fir and Engelmann spruce. On the Umatilla NF, several *Botrychium* species are found under young spruce in moist tree plantations that are 20 to 40 years old..

With the exception of *Botrychium montanum,* these four species of moonworts appear to be "seral" species favored by one-time ground disturbance, tending to appear 10 years or more after such disturbance occurs. It is possible that they die out eventually, as forest succession shades out understory plants. A mosaic of forest habitats that shift over time, providing new openings as old ones fill in, may best ensure the long-term survival of Botrychiums. However, until this is definitively known and the needs of these moonworts are better understood, it is important to preserve existing populations. Since most of the plants are quite small and are difficult to find, they may be easily overlooked except in intensive surveys. Their habitat, on the other hand, is readily identified and protected or avoided during management activities.

In the Tollgate project area, there are fifteen historically documented sites of *Botrychium minganense* with only one site (original documentation is a 2 acre polygon containing two other moonwort species no longer listed as sensitive on the RFSSL) that intersects with proposed treatment unit 73. Numerous historically documented moonwort sites on the Umatilla National Forest in NRIS TESP/IP are documented as large polygons and contain numerous species of moonworts.

There are three historically documented occurrences of RFSSL listed Oregon sensitive mountain moonwort (*Botrychium montanum*) in the project area, with one site documented in a large polygon that intersects with Tollgate proposed treatment unit 49. This mountain moonwort population was successfully relocated in July 2010 and it is northof the proposed treatment unit 49 but within 0.1 miles of the unit. The other two sites of mountain moonwort are documented in the headwaters of Swamp Creek with the nearest proposed Tollgate unit 53 about 0.5 mile to the south.

#### *Carex cordillerana* (cordilleran sedge)

Cordilleran sedge (recently split from *Carex backii*), is the rare Pacific Northwest representative of a complex of sedges occurring in upland forests. Populations are few and small and it grows in the shade of trees where it receives bright indirect sunlight (Wilson, et. al 2008). The sites on the Umatilla are mostly in riparian settings. Its broad palatable leaves attract grazers, which can easily pull up the shallow-rooted plant. There are three documented occurrences in the Tollgate project area, two on the North Fork of the Umatilla River and one on the South Fork of the Walla Walla River. These three populations are not in the vicinity of any proposed Tollgate treatment units. The nearest proposed treatment unit to the site on South Fork Walla Walla River is over 1 mile to the south (unit 42) and the nearest proposed treatment unit to the two sites on North Fork Umatilla River is greater than 1 mile to the north (unit 89).

#### *Salix farriae* (Farr's willow)

Farr's willow, a diminutive subalpine/alpine clonal willow species, is a cordilleran species ranging from Wyoming to central British Columbia with disjunct occurrences in northwest British Columbia, western Northwest Territories and southern Yukon (Flora of North America 1993+, vol.7). Known from 5 locales in Oregon, this documented site on the Umatilla occurs in a few small patches directly across Oregon State highway 204 from the snopark lot at Andies Prairie. The population is located at the source of the waters that feed the North Fork of the Umatilla River. The nearest proposed Tollgate unit (61) is over 0.5 mile to the north and east on the other side of highway 204.

### Nonvascular sensitive species

#### Chaenotheca subroscida (needle lichen)

The needle lichen is a tiny pin lichen that grows on moist conifer bark in old growth settings and requires microscopic examination for identification. One occurrence in the Tollgate project area is on the bole of a large grand fir along the North Fork Umatilla River trail. This occurrence is near the cordilleran sedge populations discussed above and the nearest proposed Tollgate treatment unit is greater than 1 mile to the north (unit 89).

### *Rhizomnium nudum* (naked rhizomnium moss)

*Rhizomnium nudum* is an Oregon sensitive moss (1-5 cm tall) that grows in damp shady sites on moist organic soil, humus and rotten logs on the forest floor in moist depressions, occasionally among boulders and talus and sometimes along streams mostly in mid to high elevation forests. The occurrence of *Rhizomnium nudum* in the Tollgate project area is along a small inlet stream on the west side of Jubilee Lake; it is growing on a vertical microsite of the upper stream embankment in filtered light on humus soil. The nearest proposed Tollgate unit is over 2 miles away to the south and west.

# INVASIVE PLANTS

## Scale of Analysis

The geographic scale of this analysis is the Tollgate EIS planning area. Measurement of the relative effects of the Tollgate Fuels Management Project on noxious weeds is based on the number of acres of previously mapped invasive plant sites and the 2010 EIS sites within proposed planning areas and along timber haul routes, and on the amount of ground disturbance anticipated from the proposed activities.

Information currently in the forest-wide noxious weed inventory database shows 16 invasive species occurring singly or in combination at 95 sites on Forest Service lands within the planning area, for a total of 2,370 gross infested acres (Table_).

The temporal scale is bounded in the past by the earliest known period in which activities would have affected invasive plant establishment and distribution in ways that persist today, and which have the potential to overlap in space and time with the direct and indirect effects of the activities included in Alternatives B or C. It is unclear which activities would have contributed to present conditions and when such activities occurred; however, this may be of little consequence. The cumulative effects of past activities with effects that overlap in space and time with the direct and indirect effects of the activities proposed under Alternatives B or C are reflected in the existing condition. The temporal scale is bounded in the future by the occurrence of the most distant reasonably foreseeable future activities with direct and indirect effects that overlap in time with the direct and indirect effects of the activities proposed under Alternatives B or C. Because out-year planning efforts typically include a 5-year timespan, and harvest activities are expected to last 3 or more years, the temporal boundary of this analysis would also be approximately 8 years in the future (year 2020).

## Affected Environment

Weed infestations planned for treatment in the Umatilla National Forest Invasive Plants Treatment Project EIS and ROD (July 2010) the and currently documented in the national Natural Resource Inventory System (NRIS) database include 16 species occurring separately or in combination at 95 sites on Forest Service land within the Tollgate planning area, covering approximately 2,370 acres (Table 3-33).

**Table 3-33 - Extent (acres) and species of invasive plants known to occur within the Tollgate planning area**

| USDA Plant Code | Common name | Infested acres |
|---|---|---|
| ARMI2 | Lesser burdock | 3.6 |
| CEBI2 | Spotted knapweed | 121.8 |
| CEDI3 | Diffuse knapweed | 213.5 |
| CERE6 | Russian knapweed | 3.1 |

| | | |
|---|---|---|
| CIAR4 | Canada thistle | 792.2 |
| CIVU | Bull thistle | 509.7 |
| CYOF | Hounds tongue | 120.8 |
| EUES | Leafy spurge | 0.5 |
| HICA10 | Meadow hawkweed | 1.6 |
| HYPE | St. Johnswort | 288.0 |
| LIVU2 | Butter and eggs | 1.5 |
| ONAC | Scotch thistle | 4.3 |
| PORE5 | Sulphur cinquefoil | 0.4 |
| SEJA | Stinking willie | 53.7 |
| TAVU | Common tansy | 0.3 |
| VETH | Common mullein | 255 |
| | **Total** | **2370** |

# WILDLIFE

## Scale of Analysis

The quantity and quality of wildlife habitat was primarily assessed using a Geographic Information System (GIS), district records, and field reviews. The best available science (Literature Cited) was used to determine effects to wildlife species in a manner appropriate for the circumstances. Vegetation information used in habitat evaluation was obtained from the project Silviculturist and Fuels Specialist, or from GIS databases, and field visits.

The scale of analysis for direct, indirect, and cumulative effects to wildlife is the Tollgate project planning area (46,460 acres), as identified on the project planning area map (Appendix A, Maps A1 and A2), with two exceptions: 1) Snags and down wood are assessed at the watershed scale and 2) Elk habitat is assessed using a 1 mile buffer around all proposed activities.

Time frames considered for direct, indirect, and cumulative effects to wildlife are short-term (within 10 years), mid-term (10-50 years) and long-term (more than 50 years). These spatial and temporal scales are appropriate given the parameters of the proposed activities and the duration of potential effects to all wildlife species addressed in this document.

Proposed harvest activities would change forest stand structure and composition on up to 9% (4,300 acres of the 46,460 acre planning area) of the project planning area. In general, these actions would directly and indirectly affect wildlife habitat parameters. Some wildlife species would benefit from these changes while others while others may not. Overall, affects to wildlife habitat is not expected to result in measureable affects to wildlife populations, and may result in increased wildlife habitat diversity in the project area.

The following categories of wildlife or habitats are discussed: old forest habitat; management indicator species; threatened, endangered and sensitive (TES) species; northern goshawk; and priority bird habitats.

# Affected Environment

## *Old Forest Habitat*

### Dedicated Old Growth

The Forest Plan allocated specific areas as Management Area (MA) C1-Dedicated Old Growth or C2-Managed Old Growth to provide old growth forest habitat across the Forest. Dedicated old growth areas were initially classified as suitable and/or capable habitat for selected management indicator species. Stand size and distribution are variable and depend on the vegetation type and target management indicator species (USFS 1990).

Nine Dedicated Old Growth (MA-C1) areas are within the project planning area (Table 3-34). One stand is in wilderness (MA-B1), and three are within the Walla Walla River Watershed (MA-F4).

**Table 3-34 — Dedicated Old Growth Areas (MA-C1) in the Project Planning Area**

| ID No. | MA-C1 Acres | General Area | MIS | Notes |
|---|---|---|---|---|
| 0623 | 156 | Middle South Fork Walla Walla River | marten | within MA-F4 |
| 0631 | 565 | Lower South Fork Walla Walla River | pileated woodpecker | within MA-F4 |
| 0643 | 240 | Lower South Fork Walla Walla River | marten | within MA-F4 |
| 0653 | 172 | Bald Mountain | marten | |
| 0665 | 337 | Upper Summer Creek | pileated woodpecker and marten | |
| 0673 | 21 | Jubilee Lake | marten | remainder outside of project planning area boundary |
| 0733 | 150 | Lower Summer Creek | marten | |
| 0753 | 190 | Upper Coyote Creek | marten | |
| 0775 | 14 | Upper North Fork Umatilla River | pileated woodpecker and marten | Overlapped by wilderness MA-B1 |
| | 1845 | Total MA-C1 | | |

### Old Forest Structure

_Umatilla National Forest Plan Amendment #11 established interim riparian, ecosystem, and wildlife standards for timber sales (the Eastside Screens) (USFS 1995). It requires that certain categories of timber sales be screened to evaluate their potential impact on riparian habitat, historical vegetation patterns, and wildlife habitat fragmentation and connectivity. The amount of old forest is evaluated to determine if it is within, above, or below the historical range.

The Umatilla Forest uses the silvicultural terms Old Forest Multi Strata (OFMS), and Old Forest Single Stratum (OFSS) structural stages to assess the amount and distribution of old forest and large tree habitat. OF structure classes, by definition, contain 10 or more live conifer trees per acre greater than or equal to 21" diameter at breast height (DBH).

Currently the amount of dry old forest multi strata (dry OFMS), moist multi strata (moist OFMS), and moist single strata (moist OFSS) are over-represented in the project planning area (Silviculture Specialist Report). Dry old forest single strata (dry OFSS) is within the historical range of variability.

Ninety-five percent of the forest in this planning area is Moist Upland Forest. The small amount of dry forest mainly consists of dry grand fir, and a very small component of Douglas-fir, western larch, and ponderosa pine. Old forest is present on about 24,500 acres, or about 65 percent of the forested acres. Large contiguous stands of old forest occur in the North Fork Umatilla River Wilderness, the Walla Walla River IRA, and the Lookingglass IRA. Old forest structure is well distributed and connected within the entire project planning area.

### Management Indicator Species

Wildlife Management Indicator Species for the Umatilla National Forest are shown in Table 3-35.

**Table 3-35 — Wildlife Management Indicator Species for the Umatilla National Forest (Forest Plan page 2-9)**

| Species | Habitat Types |
|---|---|
| Rocky Mountain elk | general forest habitat and winter ranges |
| pine marten | mature and old growth stands at high elevations |
| pileated woodpecker | dead/down tree habitat (mixed conifer) in mature and old growth stands |
| northern three-toed woodpecker | dead/down tree habitat (lodgepole pine) in mature and old growth stands |
| primary cavity excavators | dead/down tree (snag) habitat |

Habitat to support these species is present in the Tollgate project planning area

### Rocky Mountain elk and elk habitat cover

Rocky Mountain elk was selected as a management indicator species in the Forest Plan to represent general forest habitat and winter ranges for big game. Most of the project planning area is summer range for elk, but winter range is found on the lower North Fork Umatilla River and the South Fork Walla Walla

River.

The project planning area is dissected by a mix of multiple forest plan management areas, most of which do not have standards for elk. The only management area with forest plan standards for elk affected by proposed activities is MA-E2 (Timber and Big Game). Although MA-E2 occurs over 10,000 acres of the planning area, it is scattered into 10 separate areas. About 1/3 of the acres with proposed activities would not be reflected in the effects analysis of MA-E2. Therefore an additional scale was utilized, which is all FS land within 1 mile of proposed activities regardless of forest plan management area. This scale area allows for a more comprehensive and biologically appropriate assessment of potential effects to elk.

No activities are proposed in elk wintering areas.

The forest plan standards used to evaluate effects of management actions on elk habitat include percent tree cover, open road density, and an index value from the Habitat Effectiveness Index (HEI) model.

### Cover

The Forest Plan defines satisfactory cover as a stand of trees at least 40 feet tall and providing 70 percent or more canopy closure. Marginal cover is defined as a stand of trees > 10 feet tall and providing 40 percent or more canopy closure. Both types should have sufficient understory structure to obscure 90 percent of a standing elk at a distance of 200 feet. Marginal cover provides hiding and escape cover, but the tree canopy may be less dense and often provides less security. There is no forest plan standard for marginal cover; rather it is added to satisfactory cover for the total cover standard.

Currently, satisfactory elk cover occurs on 5,000 acres, or 17 percent of the 28,500 acre elk analysis area. in the project planning area, which exceeds desired conditions. Total cover occurs on 16,500 acres, or 56 percent of the 28,500 acre elk analysis area (Table 3-36).

### Habitat Effectiveness Index

The elk habitat effectiveness index model is used to predict the influence of forest management activities on elk and other big game species. This model uses the distribution of cover and forage areas, cover quality, and road factors to help indicate how effective an area will be in supporting big game (Thomas et al. 1988). It is intended to be a relative measure of habitat, and does not consider many other factors such as topography, forage quality, weather, predation, and hunting. The HEI model provides an index rating from 0 to 1, with 0 indicating the least effective elk habitat and 1 indicating optimal effective habitat. The index number is multiplied by 100 to get a whole number for comparison purposes.

The HEI index value for the elk analysis area is 63, which is above the minimum forest plan standard of 45 (Table 3-36).

**Table 3-36 — Forest Plan standards and existing condition of the Tollgate elk analysis area (all FS land within 1 mile of proposed activities)**

| Scale | Measure | Forest Plan Desired | Forest Plan Standard | Existing Condition |
|---|---|---|---|---|
| Elk Analysis Area with 1-mile buffer | Satisfactory Cover | 15-20 % | 10 % | 17 % |
| | Total Cover | NA | 30 % | 56 % |

| Scale | Measure | Forest Plan Desired | Forest Plan Standard | Existing Condition |
|---|---|---|---|---|
| (28,500 acres) | HEI | NA | 45 | 63 |

### Roads

Roads remove vegetation, reduce the effectiveness of cover, and increase disturbance to elk and other wildlife. Elk have been found to select habitats preferentially based on increasing distance from open roads (Rowland et al. 2000). Vulnerability and hunting mortality have been found to be higher in forested stands with greater road densities and less hiding cover (Weber et al. 2000).

The open road densityis is 1.2 mi/mi$^2$ within the elk analysis area. This is within the desired condition of an average of 2 miles per square mile or less, forest-wide (Forest Plan p. 4-11).

## *American Marten (pine marten)*

The American marten (*Martes americanus*) was selected as a Management Indicator Species in the Forest Plan to represent mature and old growth stands at high elevations (Table 3-35).

American marten are found throughout Canada and Alaska, south through the Rockies, Sierra Nevada, northern Great Lakes Region, and northern New England. In Oregon, they occur in the southern Oregon Coast Range, Siskiyou Mountains, Cascade Mountains, and Blue Mountains (Marcot et al. 2003). The global conservation status of marten is considered 'widespread, abundant, and secure' (NatureServe 2010).

American marten are typically associated with late-seral coniferous forests with closed canopies, large trees, and abundant snags and down wood (Zielinski et al. 2001). Wisdom et al. (2000) lists subalpine and montane forests in old multi- and single-story, and unmanaged young multi-story structural stages as providing source habitat for American marten in the Columbia Basin. A study in northeastern Oregon showed that martens selected for areas with denser canopy, more canopy layers, larger diameter live and dead trees, larger down logs, and closer proximity to water as compared to what was available in the area (Bull et al. 2005).

Marten use a variety of structures for rest and den sites, such as tree cavities, mistletoe brooms, and accumulations of down logs (Bull and Heater 2000). Bull et al. (2005) found density of potential rest sites was significantly higher in marten home ranges than in unoccupied areas.

In addition to providing rest and den sites, down wood is an important component of marten habitat because the primary prey of martens is small mammals associated with down wood. These small mammals include voles, snowshoe hares and squirrels in northeast Oregon (Bull and Blumton 1999). In the winter, they forage beneath the snow in downed wood for prey.

In a comparison of historical versus current conditions in the Blue Mountains, marten habitat appears to be strongly increasing (Wisdom et al. 2000). Suitable environments for marten are broadly distributed and of high abundance on the Umatilla National Forest, and there has been little change from historical to current conditions (Wales et al. 2011). The Umatilla National Forest provides roughly 100,000 acres of marten source habitat. Source habitat is defined as those habitats contributing to long-term population persistence (Widsom et al. 2000).

In 1990, the forest plan set aside about 1,800 acres of Dedicated Old Growth (MA-C1) for marten in the project planning area (Table 3-34). Recent vegetation data was used to determine the current amount and distribution of marten habitat in the project planning area. The project planning area provides about 10,000 acres of well-distributed marten habitat. Prime habitat is found in the wilderness and roadless portions of the project planning area where extensive, well developed riparian habitat is available.

It is possible that the Tollgate project planning area could support several reproductive pairs. Of 19 radio-collared marten in Eastern Oregon, the average home range size for males was about 6,700 acres, and the average for females was about 3,500 acres (Bull and Heater 2001). Home ranges typically include both source habitat as well as foraging areas and nonhabitat. The authors suggest that a marten reproductive pair would likely have higher success where an average of 6,700 acres are available for foraging and denning.

Marten are an elusive species, rarely observed, and difficult to detect. No marten observations have been reported in the project planning area, but they may be present.

### *Pileated woodpecker*

Pileated woodpecker (*Dryocupus pileatus*) was selected as a management indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth mixed conifer stands (Table 3-35). Pileated woodpeckers are important because the large cavities that pileated woodpeckers create in trees provide nests for many of the larger secondary cavity nesters.

Pileated woodpecker are widely distributed in forested areas of eastern North America, westward across a large swath of forest in Canada, and then southward into Montana, Idaho, Washington, Oregon, and California (Nature Serve 2010).

Pileated woodpeckers tend to prefer large blocks of grand fir and mixed conifer stands in multi strata forest with large diameter snags and down wood (Bull and Holthausen 1993). Approximately 90 percent of the diet of these birds consists of carpenter ants, which are associated with large standing and downed wood. Ponderosa pine, Douglas-fir and western larch were preferred species for foraging substrate (Bull and Holthausen 1993).

Pileated woodpeckers typically nest in tall, large diameter snags with broken tops and little remaining bark (Bull 1987). Within mixed conifer forest, pileated woodpeckers nested preferentially in ponderosa pine and western larch in northeast Oregon (Bull 1987, Nielsen-Pincus and Garton 2007). The majority of roost trees were hollow grand fir infected with Indian paint fungus and large ponderosa pine snags (Bull et al. 1992). Densities of nesting pairs of pileated woodpeckers were positively associated with the amount of late structural stage forest (Bull et al. 2007).

Two Dedicated Old Growth areas (C1) set aside for pileated woodpecker fall within the Tollgate project planning area. In general, Dedicated Old Growth areas are providing good habitat for pileated woodpecker. In 1992, biologists surveyed 100 Dedicated Old Growth areas in the Blue Mountains, including 20 on the Umatilla National Forest (NF). All of the old growth areas surveyed on the Umatilla NF (100%) were occupied by pileated woodpecker at that time (Bull and Carter 1993). In more recent years, pileated woodpeckers have been incidentally observed in the Tollgate planning area.

The pileated woodpecker is ranked as ‘widespread, abundant, and secure’ globally; more specifically in Oregon it is ranked as ‘apparently secure’ (Nature Serve 2010). The state of Oregon lists pileated woodpecker as ‘vulnerable’. The PIF database (Partners in Flight 2011) indicates an increasing population and expect future ongoing stability.

Suitable environments for pileated woodpecker have declined slightly, but are broadly distributed and of high abundance on the Umatilla National Forest (Wales et al. 2011). The Umatilla National Forest provides roughly 200,000 acres of pileated woodpecker source habitat. Source habitat is defined as those habitats contributing to long-term population persistence (Widsom et al. 2000). Overall there is little risk to pileated woodpecker viability (Wales et al. 2011).

Pileated woodpecker habitat in the Tollgate project planning area is primarily mature grand fir forest. A query of the vegetation data resulted in about 19,300 acres of pileated woodpecker foraging habitat, distributed throughout the project planning area. About half of that (10,200 acres) has large enough trees to support pileated woodpecker reproduction.

Mean home range size for paired birds in northeastern Oregon was 1,180 acres (Bull and Holthausen 1993), which would include both reproductive and foraging habitat. The Tollgate project planning area could reasonably support 5 to 8 pair of pileated woodpeckers.

The density of large snags (>20 inches DBH) was the best predictor of density of pileated woodpeckers (Bull and Holthausen 1993). An average of 8 snags per acre > 20 inches DBH were present at pileated woodpecker nest and roost sites in Eastside Mixed Conifer at the 50 percent tolerance level (Decaid Table EMC_S/L.sp-22 (Mellen-McLean et al. 2009)). Snags used for foraging, roosting, and nesting averaged 20, 28 and 30 inches DBH, respectively (Decaid Tables EMC_L.sp-17, 18, 19, & 25 (Mellen-McLean et al. 2009)).

This density of large snags (4 to 12 per acre) occurs on about 11,000 acres or 31 percent of the forest snag analysis area (see snag section below, Figure 3-9). Areas of lower snag densities (greater than zero but less than 4 per acre) would likely be used as foraging areas (Figure 3-9).

Most of the CVS snag data was collected in the 1990's in this area. Since that time, activity by Douglas-fir beetle, fir engraver, and other insects has been noted in the area (Silviculture Report in project record), and has likely resulted in additional snags.

### American Three-toed Woodpecker

American three-toed woodpecker (*Picoides dorsalis*) (formerly known as the northern three-toed woodpecker) was selected as a management indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth lodgepole pine stands (Table 3-35). They primarily eat the larvae of mountain pine beetles in lodgepole pine and tend to prefer recently dead trees (Imbeau and Desrochers 2002).

The three-toed woodpecker is a year-round resident throughout forested regions of Canada and Alaska, south into the northern New England states, Minnesota and Michigan, and south into Washington, Oregon, Idaho, and Montana, the Black Hills of South Dakota, Wyoming, Utah, Colorado, eastern Nevada, central Arizona, and southern New Mexico (Nature Serve 2010).

The global status of three-toed woodpecker is 'secure' due to it's wide distribution, but considered 'vulnerable' in Oregon and Washington (Nature Serve 2010). The Umatilla forest has very few records for three-toed woodpeckers, and none in the Tollgate project planning area.

Three-toed woodpecker distribution can be patchy and may change frequently as they follow in the path of insects outbreaks, making it very difficult to determine population trends. North American Breeding Bird Survey (BBS) data for 1980–1998 indicate a significant annual decrease in populations across the species' range in North America, however, this data should be viewed with caution given the low number of routes and low abundance of three-toed woodpeckers per route (Leonard 2001).

Potential habitat for three-toed woodpeckers in the Tollgate project planning area was identified by querying the vegetation database for dense, moist mixed conifer, spruce, subalpine fir, and lodgepole pine. Query results indicate that there are about 20,700 acres of potential foraging habitat for three-toed woodpeckers in the project planning area. Habitat is well-distributed and well-connected throughout the planning area.

Current estimates indicate there are 170,000 acres of three-toed woodpecker habitat on the forest (Wales, personal communication). Tollgate project planning area contributes about 12 percent to the forest-wide habitat for three-toed woodpeckers.

Three-toed woodpecker nests are preferentially created in mature trees with heart rot (Goggans et al. 1988), and it is suggested that 500 acres of mature/overmature lodgepole pine may be needed per pair of birds. Most of the possible three-toed woodpecker nesting habitat in the Tollgate project planning area is in grand fir and spruce cover types, with about 1,800 in lodgepole pine. Only 400 acres are old growth lodgepole pine. With about 15,000 acres of old forest in spruce, fir and lodgepole pine in the project planning area, a rough estimate based on the above factors is that there may be enough nesting habitat for 3 to 5 pair of three-toed woodpeckers.

### *Primary Cavity Excavators (Snag Habitat)*

Primary cavity excavators as a group were selected to represent dead/down tree (snag) habitat that a vast array of vertebrate species depend on for reproduction and/or foraging (Table 3-35). Primary cavity excavators create holes for nesting or roosting in live, dead or decaying trees. Secondary cavity users such as owls, bluebirds, and flying squirrels may use these cavities later for denning, roosting, and nesting.

Habitat for primary cavity excavators includes coniferous and hardwood stands in a variety of structural stages and the availability of dead trees in various size and decay classes (Thomas 1979). Primary habitat generally contains snags greater than 15 inches DBH, while smaller sizes provide secondary habitat.

Snag habitat in the Tollgate project planning area is variable with most available in areas of light or no management activities, and less in areas of intensive management. Areas with low snag densities are primarily due to past clearcut harvest that took place in the 1950's to 1960's. In other areas, insect and disease activity, drought, and overstory mortality due to high stand densities have created new snags and down wood.

Forest-wide, snag densities are similar to reference values (Mason and Countryman 2010). This would indicate that overall available snag habitat is contributing to viable populations of primary cavity excavators.

A snag analysis is used to evaluate habitat for primary cavity excavators in the affected watersheds. Snag habitat was assessed using the Current Vegetation Survey (CVS) data collected in the Lookingglass, South Fork Umatilla, and South Walla Walla River watersheds. CVS inventories (Brown 2003) are permanent plots on a 1.7-mile grid that sample the vegetative condition on Forest Service land. The historical range of variability in the Tollgate project planning area (Silviculture Report, pp. 34-37) is also used as a frame of reference.

While a wide range of snag densities are present in the project area and the snag analysis area, the average snag densities in the affected watersheds far exceed Forest Plan minimum standards (Table 3-37). This would indicate that the snag analysis area contains adequate structural habitat features desired by a number of primary cavity excavating species and other wildlife.

Cold upland forest is not represented in the data because it makes up less than one percent of the analysis area.

**Table 3-37 — Forest Plan standards and existing conditions for snag density in Tollgate Snag Analysis Area**

| **Umatilla Forest Plan Standards** | | | **Existing Condition, Tollgate Snag Analysis Area** | | |
|---|---|---|---|---|---|
| Working Group | Diameter Class (inches DBH) | Average Snag Density (#/acre) | Potential Vegetation Group | Diameter Class (inches DBH) | Average Snag Density (#/acre) |
| Ponderosa Pine | ≥ 10 | 2.25 | Dry Upland Forest | ≥ 10 | 8.1 |
| | ≥ 20 | 0.14 | | ≥ 20 | 2.4 |
| Mixed Conifer (South Associated) | ≥ 10 | 2.25 | Moist Upland Forest | ≥ 10 | 21.6 |
| | ≥ 20 | 0.14 | | ≥ 20 | 4.9 |
| Lodgepole Pine / Subalpine Zone | ≥ 10 | 1.80 | Cold Upland Forest | ≥ 10 | no data |
| | ≥ 20 | No standard | | ≥ 20 | no data |

The Forest Plan established minimum standards for snag density based on the population requirements of species associated with snags (Table 3-37). Based on new science, these biological potential models are considered an outdated technique for determining snag retention needs (Rose et al. 2001). In light of this, the Tollgate project would leave more snags in treatment units than required in the Forest Plan.

The Forest Plan minimum standard is 0.14 snags > 20 inches DBH per acre, with additional smaller DBH snags to total 2.25 per acre. In this project, at least **3** large snags (≥ 20 inches DBH) per acre would be retained in all units where they occur. In addition, all functioning snag habitat (broken top, signs of excavation, etc.) would be retained wherever possible. Because the aim of the Tollgate project is to reduce ladder fuels and crown fire potential, minimal impacts to snags are expected.

The Decayed Wood Advisor (DecAID) Mellen-McLean et al. (2009) is a synthesis of published scientific literature, research data, wildlife databases, forest vegetation databases, and expert judgment and experience. DecAID is not a mathematical model or wildlife/wood-decay simulator, and does not suggest snag retention levels for individual harvest units.

DecAID was used to compare dead wood availability in the Tollgate snag analysis area to a reference condition. The reference condition is derived from snag data in DecAID that was collected from unharvested areas over the entire Blue Mountains. Although the data from unharvested areas may not accurately reflect "pre-settlement" or "natural" conditions in eastside forests due to years of fire exclusion (Mellen et al. 2006), it is comparable to other estimates of historical dead wood densities (Harrod et al. 1998, Agee 2002, Ohmann and Waddell 2002).

The following figures represent a comparison of snag distributions in the Tollgate Snag Analysis Area to these reference conditions. While there are many assumptions and limitations to this data, it provides a general picture of the numbers of snags in the area.

In dry forest, snags are relatively abundant in the overall snag analysis area. The data and charts for dry forest are available in the Wildlife Analysis file, but not displayed here because only about 100 acres of dry forest is affected, which is less than one percent (.0027) of the forest in the project planning area. These dry areas are intermixed with moist forest.

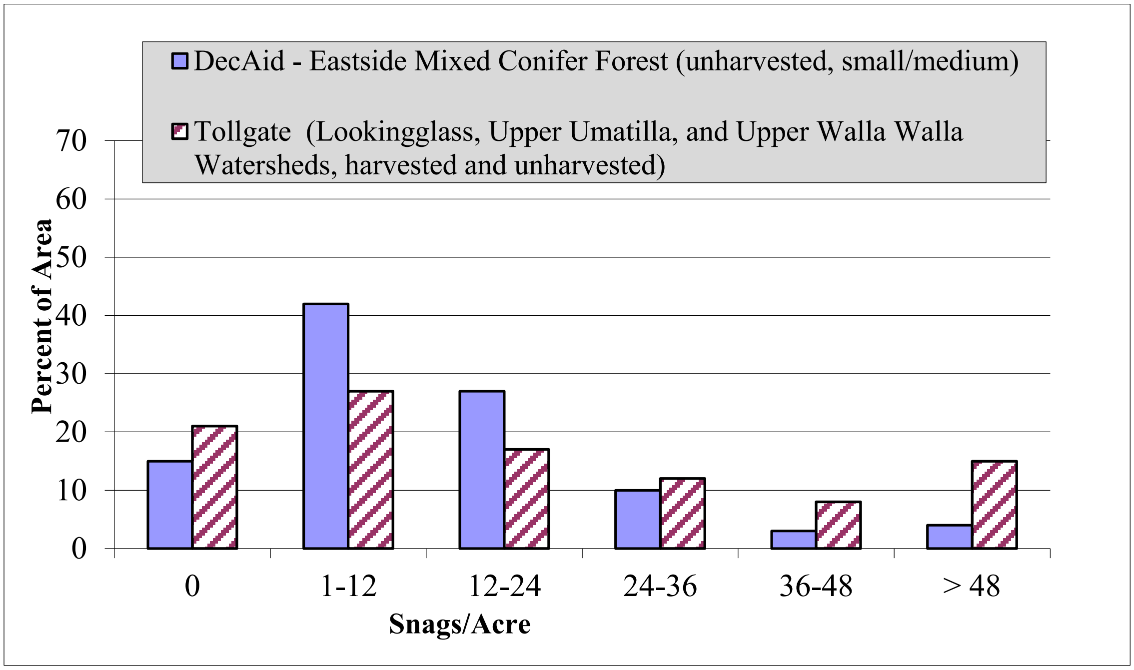


**Figure 3-8 — Distribution of Snags > 10 Inches DBH in Moist Upland Forest**

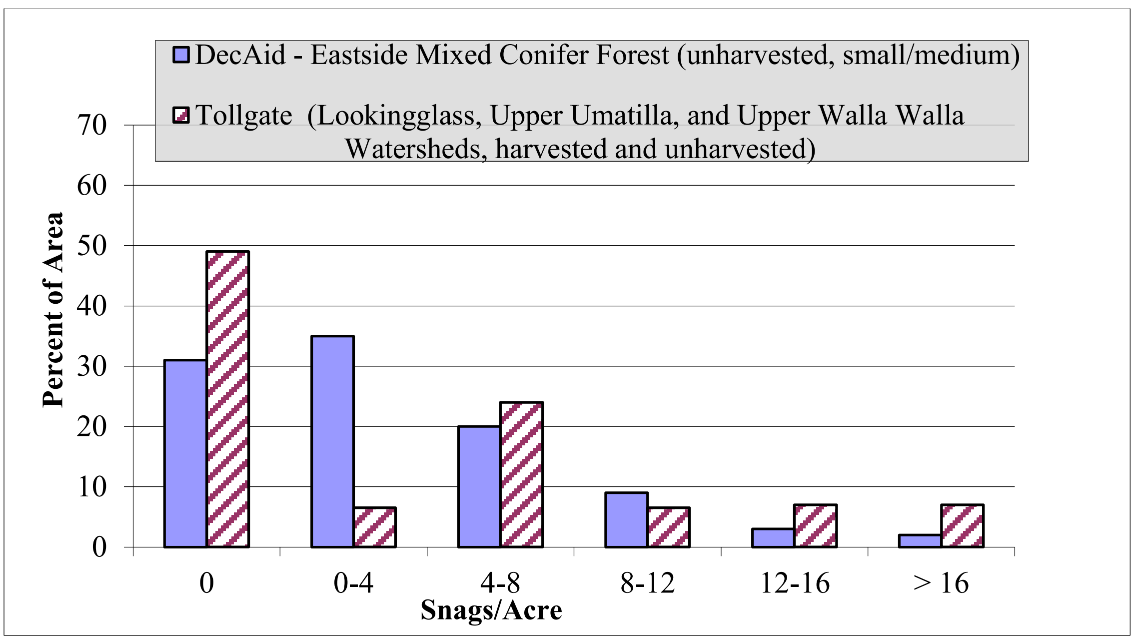


**Figure 3-9 — Distribution of Snags > 20 Inches DBH in Moist Upland Forest**

About 10 percent of the moist upland forest has fewer snags than would be expected under natural (unharvested) conditions (Figure 3-8 and Figure 3-9). The amount of area with 0 snags per acre greater than 20 inches DBH is about 18 percent more than reference conditions, which indicates there is more area without snags than typically seen in unmanaged areas of the Blue Mountains. This is likely due to past clearcut harvesting  and salvage of bug and disease killed trees over the past 60 years.

Insect and disease continues to be prevalent in the area (Silviculture Specialist Report), creating new snags all the time.

## Northern Goshawk

The northern goshawk is not a Management Indicator Species in the Forest Plan, and is not listed as Threatened, Endangered, or Sensitive.  However, the Forest Plan as amended (Regional Forester's Eastside Forest Plan Amendment 2) provides for specific protections for goshawk nesting territories (USFS 1995). Northern goshawk is considered 'sensitive-critical' by the state of Oregon.

The northern goshawk is considered a habitat generalist at large spatial scales, however it typically nests in a narrow range of structural conditions (Squires and Kennedy 2006).  Goshawks prefer mature forest with large trees, and relatively closed canopy with an open understory for nesting. Nests are frequently found near the lower portion of moderate slopes and near water.

A study in the Blue Mountains found that structural stage, tree basal area, and low topographic position reliably discriminated between nests and random sites.  Positive correlations were found between fledging rate and tree basal area within 1 ha of the nest (McGrath, et al. 2003).

A query of vegetation data for areas with at least 50 percent tree cover and the presence of large diamter trees resulted in approximately 18,000 acres of potential goshawk nesting habitat. These stands are well distributed throughout most of the planning area.  Prime habitat is found in the wilderness and roadless areas where large areas of  contiguous habitat exist along well developed riparian corridors. Quality nesting habitat would typically be within one-quarter (1/4) mile of water, in the lower portion of the slope, and often on the north facing slope.

Goshawk surveys have not yet been conducted, but would be targed in potential nesting habitat that could be affected by proposed project activites.  If active nests are found at any time, they would be protected as specified in the project design criteria (Table 2-7).

## Landbirds

Neotropical migratory birds are those that breed in the United States and winter south of the border in Central and South America.  Continental and local declines in population trends for migratory and resident landbirds have developed into an international concern.  Roughly one half of all birds occurring on the Umatilla Forest are Neotropical migrants.  Many of these species are associated with old forest, riparian areas, or unique features such as aspen, shrubs, and meadows.

Partners in Flight (PIF) led an effort to complete a series of Bird Conservation Plans for the entire continental United States to address declining population trends in migratory landbirds.  These plans are used to address the requirements contained in Executive Order (EO) 13186 (January 10, 2001), Responsibilities of Federal Agencies to Protect Migratory Birds.

*The Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* (Altman 2000) identifies the following priority habitat types:  Dry Forest, Late Successional Mesic Mixed Conifer, Riparian Woodland and Shrub, and several "unique" habitats (Table 3-38).

**Table 3-38 — Priority Habitat Features and Associated Landbird Species for Conservation in the Northern Rocky Mountain Landbird Conservation Region of Oregon and Washington (Altman 2000)**

| Habitat Type | Habitat Feature/Conservation Focus | Focal Species |
|---|---|---|
| Dry Forest | Large patches of old forest with large trees and snags | White-headed woodpecker |
| | Old forest with large trees & snags interspersed with grassy openings and dense thickets | Flammulated owl |
| | Open understory with regenerating pines | Chipping sparrow |
| | Patches of burned old forest | Lewis' woodpecker |
| Mesic Mixed Conifer | Large snags | Vaux's swift |
| | Overstory canopy closure | Townsend's warbler |
| | Structurally diverse; multi-layered | Varied thrush |
| | Dense shrub layer in the forest understory or forested openings | MacGillivray's warbler |
| | Edges and openings created by wildfire | Olive-sided flycatcher |
| Riparian | Large snags in riparian woodland | Lewis' woodpecker |
| | Riparian woodland canopy foliage and structure | Red-eyed vireo |
| | Riparian woodland understory foliage and structure | Veery |
| | Shrub density Willow/alder shrub patches | Willow flycatcher |
| Unique (special) Habitats | Subalpine Forest | Hermit thrush |
| | Montane meadow | Upland sandpiper |
| | Steppe shrubland | Vesper sparrow |
| | Aspen | Red-naped sapsucker |
| | Alpine | Gray-crowned rosy finch |

### Dry Forest Habitat

The dry forest habitat type includes coniferous forest composed exclusively of ponderosa pine, or dry stands co-dominated by ponderosa pine and Douglas-fir or grand fir (Altman 2000). Bird species associated with dry forest have shown the greatest population declines and range retractions in the northern Rocky Mountain province (Altman 2000). In particular, bird species highly associated with snags and old-forest conditions have declined. These species include white-headed woodpecker, flammulated owl, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker.

Habitat for focal species such as white-headed woodpecker, flammulated owl, and Lewis' woodpecker is very limited here, because the Tollgate project planning area is predominantly a cool moist forest. Currently there are only about 330 acres of single strata, large diameter ponderosa pine stands in the project planning area. There are about 800 acres of the dry, ponderosa pine cover type, so the capacity is there for more. Dry old forest single strata (dry OFSS) is within the historical range of variability (Silviculture Specialist Report).

### Mesic Mixed Conifer Habitat

Mesic mixed conifer habitats are primarily cool Douglas-fir, grand fir sites and larch sites. The desired condition is a multi-layered old forest with a diversity of structural elements. Conservation focal species and habitat conditions include: Vaux's swift for large snags; Townsend's warbler for overstory canopy closure, varied thrush for structural diversity and multiple layers; MacGillivray's warbler for a dense shrub layer in forest openings or understory; and olive-sided flycatcher for edges and openings created by fire.

Mesic mixed conifer habita is abundant in the project planning area. There are about 10,000 acres of Douglas-fir, grand fir sites and larch sites with multiple layers and large trees in the project planning area. Dense shrub layers occur in patches but are uncommon, and there are no openings created by fire.

### Riparian Woodland and Shrub Habitat

Riparian vegetation is particularly important to Neotropical migratory songbirds (Sallabanks et al. 2001:217). This habitat type includes riparian communities dominated by shrubs (willow, alder, etc.) that occur along bodies of water or in association with wet meadows and wetlands (Altman 2000). The desired condition is a structurally diverse vegetative community of native species that occur in natural patterns relative to hydrological influences. Focal species and habitat conditions include: Lewis' woodpecker for large snags; red-eyed vireo for canopy foliage and structure; veery for understory foliage and structure; and willow flycatcher for willow/alder shrub patches. Riparian hardwood habitat is available along numerous streams in the area, including Summer Creek, Lookingglass Creek, and the North Fork Umatilla River.

### Subalpine Forest

This habitat type is the coolest and wettest forest zone, dominated by subalpine fir, Engelmann spruce, lodgepole pine, and huckleberry. Important features of the subalpine forest are a multi-layered structure and dense understory of shrubs (Altman 2000), and the focal species is the hermit thrush. Multi-layered subalpine fir, Engelmann spruce, and lodgepole pine is common in the Tollgate project planning area, totalling 10,300 acres.

### Montane Meadow

This habitat type includes wet and dry meadows dominated by herbaceous vegetation and grass at moderate and high elevations. These meadows are generally associated with streams and springs. The upland sandpiper is the focal species, but is not known to occur in the planning area. Other species that benefit from conservation of this habitat are sandhill crane, long-billed curlew, Wilson's phalarope, common snipe, and savanna sparrow. There are about 70 acres of meadow; the largest being Target

Meadow at 40 acres.

### Steppe-Shrubland

Steppe-shrublands occur in a wide range of habitat types, including grassland, sagebrush, montane meadows, fallow fields, juniper-steppe, and dry open woodlands and openings in forested habitats (Altman 2000). Habitat criteria (objectives) for the steppe-shrubland habitat type include maintaining a mosaic of steppe and shrubland habitats with < 10 percent tree cover. Associated bird species include vesper sparrow, lark sparrow, Brewer's sparrow, and long-billed curlew.

A large amount of grassland and shrub habitat is available in the project planning are, totalling 8,500 acres. The largest grass areas are on the south facing slopes along the North Fork Umatilla River.

### Aspen

Bird species associated with aspen include the red-naped sapsucker, Williamson sapsucker, tree swallow, northern pygmy owl, western screech owl, and others. Aspen stands have declined throughout the Blue Mountains, due to a combination of factors including fire suppression, competition with invading shade-tolerant species, overgrazing (livestock and wild ungulates), and drought.

There are 16 known aspen sites in the project planning area. Most are small (less than 1 acre) and scattered throughout the planning area. Many of these aspen stands are being actively restored using methods such as fencing, conifer removal, and planting.

## Affected Environment – Threatened, Endangered, and Sensitive Wildlife and Invertebrate Species

An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all, or a significant portion, of its range. A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of, its range.

A species list was obtained from the US Fish and Wildlife Service in order to identify which endangered, threatened, de-listed, candidate, and proposed species, if any, may be present in the project area. The list indicated that there are no threatened, endangered, or proposed wildlife species expected to occur in Umatilla County. One candidate species, the Columbia spotted frog is addressed as a sensitive species below. The northern bald eagle and the American peregrine falcon were identified as delisted species. These species are also addressed as sensitive species below.

A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species existing distribution.

Threatened, Endangered and Sensitive Species addressed on the Umatilla National Forest include those that have been documented (D - valid, recorded observation) or are suspected (S - likely to occur based on available habitat to support breeding pairs/groups) to occur within or adjacent to the Umatilla National Forest boundary. Whether these species may occur in the Tollgate project analysis area is determined by

observation records, vegetative and wildlife species inventory and monitoring, published literature on the distribution and habitat utilization of wildlife species, information provided by the US Fish and Wildlife Service, and the experience and professional judgment of wildlife biologists on the Umatilla National Forest (Table 3-39).

**Table 3-39 — Endangered, Threatened, Proposed and Sensitive Wildlife and Invertebrate Species and their Potential to Occur within the Tollgate Project Area**

| Species | Status | Umatilla Forest | Tollgate project planning area |
|---|---|---|---|
| Canada lynx<br>*Lynx canadensis* | Threatened | Documented | no |
| Gray wolf<br>*Canis lupus* | Sensitive | Documented | Documented |
| Wolverine<br>*Gulo gulo* | Sensitive | Suspected | Possible |
| Townsend's big-eared bat<br>*Corynorhinus townsendii* | Sensitive | Documented | Possible |
| Bald eagle<br>*Haliaeetus leucocephalus* | Sensitive | Documented | Documented |
| Peregrine falcon<br>*Falco peregrinus* | Sensitive | Suspected | no |
| White-headed woodpecker<br>*Picoides albolarvatus* | Sensitive | Documented | Possible |
| Lewis' woodpecker<br>*Melanerpes lewis* | Sensitive | Documented | Possible |
| Upland sandpiper<br>*Bartramia longicauda* | Sensitive | Suspected | no |
| Painted turtle<br>*Chrysemys picta* | Sensitive | Suspected | no |
| Columbia spotted frog<br>*Rana luteiventris* | Sensitive | Documented | Documented |
| Rocky Mountain tailed frog<br>*Ascaphus montanus* | Sensitive | Documented | Documented |

| | | | |
|---|---|---|---|
| Fir pinwheel<br>*Radiodiscus abietum* | Sensitive | Documented | Possible |
| Western ridged mussel<br>*Gonidea angulata* | Sensitive | Documented | Possible |
| Johnson's hairstreak<br>*Callophrys johnsoni* | Documented | Suspected | Possible |

Therefore, species that are addressed in this section are: Canada lynx, gray wolf, wolverine, Townsend's big-eared bat, bald eagle, Lewis' woodpecker, white-headed woodpecker, Columbia spotted frog, Rocky Mountain tailed frog, fir pinwheel, Western ridged mussel, and Johnson's hairstreak.

Because there is no indication that they may occur in the project analysis area, the following wildlife species will not be discussed further: peregrine falcon, upland sandpiper, and painted turtle.

Because there is no indication that they may occur in the project analysis area, the following invertebrate species will not be discussed further: Columbia clubtail, shortface lanx, Hells canyon land snail, Yuma skipper, and Intermountain sulphur.

### Canada lynx (Threatened)

Historical records indicate that Canada lynx was present on the forest at one time, but currently the Umatilla Forest is considered unoccupied (USFS 2006). The U.S. Fish and Wildlife Service concluded that lynx may occur on the forest as dispersers that have never maintained resident populations. This is based on the lack of reproduction records, limited verified records of lynx, low frequency of occurrences, and correlations with cyclic highs with populations in Canada (USFWS 2003).

### Gray wolf (Sensitive)

The project planning area is within the Northern Rocky Mountain Distinct Population Segment (DPS) of the gray wolf, which was recently removed from the Endangered Species List (USFWS 2011, USFWS 2009). However, the state of Oregon will continue to manage gray wolf as a state endangered species until more packs are established (ODFW 2010).

The gray wolf is a habitat generalist inhabiting a variety of plant communities typically containing a mix of forested and open areas with a variety of topographic features. Three wolf packs have been identified that utilize areas of the Walla Walla Ranger District. Individual wolves have been occasionally observed in the Tollgate project planning area, but no denning or rendezvous sites have been found.

### Wolverine (Sensitive)

Wolverines have not been documented in this area, but may pass through undetected and/or stay for short periods. They typically inhabit high elevation conifer forest where sufficient food is available and human activity is low. Denning habitat is usually open rocky talus slopes where snow depths remain over 3 feet into spring. They tend to forage over large areas and travel long distances. The majority of the project planning area is suitable for wolverine foraging, but no potential denning areas are known or suspected.

### *Townsend's big-eared bat (Sensitive)*

The big-eared bat is strongly associated with spacious cavern-like structures for roosting during all stages of its life cycle (Gruver and Keinath 2006). Typically, they use caves and mines, but have been noted roosting in attics and abandoned buildings, large hollows of redwood trees, in lava tubes and under bridges (Gruver and Keinath 2006). These sites are highly sensitive to disturbance and human interference. A big-eared bat roost is present in a collection of old buildings a few miles outside of the project planning area.

Individuals or small groups of bats may also day roost in hollow and creviced trees and snags near water for a limited time, but tend to stay within a few miles of colonial roosts (Perkins and Schommer 1992). Therefore they are not expected to be present near the proposed activities.

### *Bald eagle (Sensitive)*

Bald eagles occasionally travel through the project planning area. They have been seen at both Langdon and Jubilee Lakes, but no roost or nest sites are known in the project planning area. The nearest documented nest is on the Grande Ronde River, but has not been used for several years. A small number of bald eagles winter along the lower Umatilla River, outside of the project planning area.

### *White–headed woodpecker (Sensitive)*

White-headed woodpecker habitat is typically open ponderosa pine with large trees and snags. This species relies almost exclusively upon the seeds from large ponderosa pine cones for its foraging needs. This species will also utilize insects that are gleaned off ponderosa pine trees. Large ponderosa pine snags are utilized for nesting purposes. This type of habitat is scarce in the project planning area. One large stand is found along Woodward Creek and another along Summer Creek, but the rest are small scattered stands totalling 540 acres. All of these stands are dry grand fir forest with a large pine component. The district has no records of white-headed woodpecker occurring in the project planning area.

In addition to evaluating white-headed woodpecker habitat in the project planning area, snag habitat is evaluated at the watershed scale in the Management Indicator Species, primary cavity excavator section of this chapter.

### *Lewis' woodpecker (Sensitive)*

Lewis' woodpecker may occur, but there are no records for this part of the district. Lewis woodpeckers tend to use open ponderosa pine forest, open riparian woodland dominated by cottonwood, and burned pine forest (Tobalske 1997). This type of habitat is scarce in the project planning area. One large stand is found along Woodward Creek and another along Summer Creek, but the rest are small scattered stands totalling 540 acres. In addition, cottonwood trees are present along the north and south forks of the Umatilla River. There is no burned pine forest available.

In addition to evaluating Lewis' woodpecker habitat in the project planning area, snag habitat is evaluated at the watershed scale in the Management Indicator Species, primary cavity excavator section of this chapter.

### *Columbia spotted frog - Great Basin DPS (Sensitive)*

Spotted frogs have been observed in the project planning area. The species has been found in streams, ponds, and marshy areas with abundant aquatic vegetation throughout the Umatilla Forest. Columbia spotted frogs are highly aquatic and rarely found far from permanent water, but they can also utilize intermittent streams and meadows in the spring. They seasonally move between hibernacula (overwintering sites), breeding habitat, and wet meadow /riparian foraging areas (Bull and Hayes 2002).

### *Rocky Mountain tailed frog (Sensitive)*

Tailed frogs have also been observed in the project planning area. Tailed frogs inhabit cold, high gradient, boulder and cobble dominated streams for breeding. Streams with dense overstory shade are preferred. Froglets and adults are closely associated with the streams, often hiding in gravel and cobble substrates. Tadpoles cling to boulders and cobbles; full development of this species requires as many as 5 years to complete.

### *Fir pinwheel*

Fir pinwheel are snails typically found near perennial water near talus or under down logs. They have been found on the western portions of the district, but no surveys have been done within the Tollgate Project Planning Area.

### *Western ridged mussel*

Western ridged mussel is a bivalve mollusk that is found in areas of shallow, constant flow with well oxygenated substrates; areas with sand and gravel bars; and available fish for glochidia to attach to. It is possible that the larger creeks in the analysis area may provide these elements. No western ridged mussel records are known within the analysis area, but they have been documented nearby, in the Umatilla River drainage.

### *Johnson’s hairstreak*

Johnson’s hairstreak is a butterfly that lives on dwarf mistletoe in the tree canopy. It is widely distributed in Oregon, but considered to be very localized and scarce with few “big” years. In western Oregon it is associated with grand fir dwarf mistletoe, which is not present here. In northeastern Oregon it has been found feeding on western dwarf mistletoe specific to ponderosa pine.

# RECREATION

## Scale of Analysis

The Tollgate Fuels Reduction project planning area is located on Umatilla Ranger District and is approximately 46,464 acres in size. It is primarily situated in Umatilla County and partially in Union County. Its boundary crosses the Upper Umatilla, Upper Walla Walla River and Lookingglass Creek watersheds. The recreation analysis considered the area within the project area boundary, unless otherwise noted.

### *Measures and Indicators*

The indicators that are used to measure effects to recreation resources are the following:

**Developed and Dispersed Camping:** Recreation experience and availability (See recreation goals A2, and A6)

**Access and Dispersed Recreation Activities:** Travel Access, Safety, and Desired Use (See recreation goal A2)

**Recreation Opportunity Spectrum:** Level of development and settings (See ROS definitions and map)

**Sense of Place:** Characteristics consistent with Recreation Niche Statement

### *Recreation Opportunity Spectrum (ROS)*

"The Recreation Opportunity Spectrum offers a framework within which to explicitly vary situation attributes (access, density, etc.) to produce different recreation settings". (Recreation Opportunity Spectrum, p. 7) The classification primarily considers vehicular travel mode, and the type of facilities provided within an area.

The ROS classes found in this project area include: Semi-Primitive Motorized, Roaded Natural, and Roaded Modified.

Semi-Primitive Motorized- Area is characterized by a predominantly natural or natural appearing environment of moderate to large size', with a low concentration of users, motorized recreation use permitted only on unmade local primitive roads, and the area managed to have subtle minimum on-site controls and restrictions.

Roaded Natural- Area is characterized by predominantly natural appearing environments with moderate evidence of the sights and sounds of humans.  Such evidence usually harmonizes with the natural environment.  Interaction between users may be moderate to high with evidence of other users prevalent.  Resource modification and utilization practices are evident but harmonize with the natural environment.  Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

Roaded Modified- Area is characterized by a natural environment that has been substantially modified by development of structures and vegetative manipulation.  Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high.  Facilities are often provided for special activities.  Moderate user densities are present away from developed sites.  Facilities for intensified motorized use and parking are available. (USDA Forest Service 1990)

The project area ROS acres are shown in Table 3-40.

**Table 3-40 — Tollgate Treatment Acres by ROS Classification**

| ROS Classification | Acreage |
|---|---|
| Roaded Modified | 1094 |
| Roaded Natural | 2889 |
| Semi-Primitive Motorized | 24 |

### *Sense of Place*

Sense of place is addressed to display how the area is perceived by the public, and to display the physical setting in which the project area lies.  The Umatilla NF uses the Sense of Place definition: "*The identity of a place created by people's social meanings and attachments, including valued scenery and recreation settings, cultural and spiritual values, economic, social and biophysical characteristics.*" Managers using the concept of sense of place must define a specific framework for the definition and use of sense of place.

The Forest Service has developed the Recreation NICHE process for recreation facilities analysis. This process was developed to define the particular recreation niche the forest could provide for the public. The Forest defined spatial units that had particular characteristics which could support a defined set of recreational experiences. The Umatilla National Forest conducted a recreation facilities analysis which characterized the forest and defined spaces in terms of use and sense of place. The Tollgate project area lies primarily within the Blue Mountains. The characterization of this area is as follows:

> Emphasis Statement: This scenic country rests on the northern edge of the John Day Valley to the Palouse where solitude and tradition are a way of life. For centuries this wild landscape has provided sustenance for Native Americans, early settlers, miners and modern day explorers creating a human connection with the land that cannot be denied. The Umatilla National Forest is known nationally for its quality big game viewing and hunting. With growing cities and small communities surrounding the forest, it's a place to teach and maintain traditional values and recreation activities (hunting, fishing, horseback riding, hiking, gathering, viewing, and winter sports). The forest emphasizes ways for non-traditional visitors to enjoy these activities. Rustic facilities showcasing a rich heritage capture the traditional spirit and connect new and old generations to this timeless landscape.
>
> Forest-wide Settings, Special Places, and Values: The forest is a vast landscape that spans the Blue Mountains of southeast Washington and northeast Oregon. From rugged mountain ridges and forested hills to sage brush plains, this forest is home to over 300 different wildlife species including one of the largest elk herds in the nation. Wild and Scenic Rivers, Wilderness Areas and other undeveloped areas form the core of this wild landscape. Ranching, logging and grazing are an integral part of this place and have shaped the culture and the land. Freedom, solitude and scenery abound contributing to a quality of life that draws people to this place. Easy access and well located facilities provide incredible settings on this broad landscape.
>
> Concentrated Recreation – Key high recreation use corridors on the forest where more developed facilities would be concentrated. Opportunities exist to connect new visitors to the land and for use to be dispersed out to more remote settings.
>
> Hunting/Dispersed – General forest areas where more rustic facilities support hunting and other traditional recreation activities such as OHV riding, horseback riding and hiking.
>
> Wilderness/Backcountry – Designated Wilderness, Wild and Scenic Rivers and other undeveloped areas that are remote and provide a high degree of solitude with an emphasis on self-reliance.
>
> Forest-wide Activities/Opportunities/Experiences: The Forest offers a mix of day-use and overnight facilities in support of traditional activities including hunting, fishing, winter sports, gathering and viewing. Exceptional hunting is the major recreation draw for the forest. Overnight facilities are common, small, and rustic supporting day-use activities. The Area's rich history is showcased as an integral part of the recreation program to further the connection to the land with new visitors.
>
> Concentrated Recreation – Focus higher developed recreation in this setting with key activities on viewing, hiking, picnicking and camping. Work with local communities to define the new/non-traditional visitor demands and focus the outcome in this setting.
>
> Hunting/Dispersed - Focus hunting opportunities in this setting with other traditional activities: OHV riding, horseback riding, backcountry skiing, snowmobiling, gathering and viewing.

Wilderness/Backcountry - Focus on opportunities requiring more self-reliance including, hunting, fishing, horseback riding, hiking and backpacking.

The ***Tollgate project area*** use is primarily as a hunting/dispersed and winter recreation area as well as a recreation residence area. The area is used for dispersed camping, huckleberry and mushroom picking, snowmobiling and hunting. There are some concentrated use areas around the lakes. The sense of place is derived from the setting of a mountain plateau above steep canyon drainages.

### *Spatial and Temporal Boundary*

The spatial boundary for cumulative effects for recreation includes the project boundary. Recreation should not be significantly affected beyond this area; people recreating outside of the project boundary would not likely be impacted by this Project.

The temporal boundary for cumulative effects for recreation is the project implementation timeframe. The recreation opportunities are not expected to be effected after the implementation period is complete

## Affected Environment

The existing condition for recreation resources is considered in terms of facilities, travel and access, recreation opportunity spectrum and sense of place.

**Target Meadows Campground** is located 2 miles north of Tollgate off Forest Service Road 204, on Forest Service Road 6401. Target Meadows is a nice spot around a meadow with access to South Fork Walla Walla River Trail. Amenities include tent camping, picnic tables, toilets, drinking water, and parking. The campground is open from July 4$^{th}$ to Labor Day weekend.

**Woodland Campground** is located on the edge of Langdon Lake on Hwy 204. Amenities provided include tent camping, picnic tables, toilets, drinking water, and parking. The campground is open from July 4$^{th}$ to Labor Day weekend.

**Woodland Campground** is a nice, green spot to picnic or camp, with both shady and sunny areas available. It's a handy place to set up camp for the night, located just off Hwy 204. The amenities provided include tent camping, picnic tables, toilets, drinking water, and parking. The campground is open from July 4$^{th}$ to Labor Day weekend.

**Jubilee Lake Campground** is a developed campground along the southern edge of Jubilee Lake on FS RD 64. The largest and most popular campground on the Umatilla National Forest, Jubilee Lake is nestled among the trees. The lake provides a beautiful setting for day-use as well as camping. This campground provides many amenities including: boat ramp, tent camping, picnic tables, toilets, drinking water, and parking. The campground is open from July 4$^{th}$ to Labor Day weekend.

There is no inventory of dispersed campsites in the project area; however there are a number of traditional dispersed campsites scattered throughout.

A generic description of a dispersed campsite consists of a user-made area that is generally adjacent to a developed road. The site often has a meat pole in the trees, a rock fire ring and a hardened parking/camping surface for one to three families. Dispersed camping has traditionally been a popular activity in the area, particularly during big game hunting season. People currently disperse camp in or near past harvest treatment areas where vegetation activities are more noticeable.

There are a number of popular recreation activities in the area besides camping that occur year around including; hiking, horseback riding, All Terrain Vehicle (ATV) riding. mushroom and berry picking, hunting, sight seeing, snowmobiling, cross-country skiing

#### Travel/Access

During the spring summer and fall months, there are 156 miles of roads that provide access for hiking, ATV riding, hunting, berry picking and sightseeing. The Walla Walla District Access and Travel Management Plan designates 67 miles as open, and 81 miles as closed. All roads in the planning area are seasonal roads for the purposes of winter recreation. Open roads of Maintenance Level 3, 4, and 5 are available and maintained for passenger vehicles; other roads, Maintenance Level 1 and 2 require high clearance vehicles.

Snowmobiling is a popular winter activity across the Walla Walla Ranger District. There are 53 miles of groomed routes within the project area. The Morning Creek Sno-Park is located at the eastern edge of the project area at the forest boundary on Highway 204. This sno-park is the primary staging facility on the east side of the Walla Walla Ranger District.

# VISUAL RESOURCES (SCENERY)

## Scale of Analysis

### *Scenic Integrity*

The scale of analysis for scenic integrity determined by the visible areas from the routes determined to be sensitive to viewers in the Forest Plan. The visible area from a sensitive route is known as a viewshed. The scenery resource analysis will focus on the units that are within these viewsheds.

### *Scenic Stability*

The scale of analysis for scenic stability is determined by the project area boundary that is proposed to treat the area to improve the resiliency of the area vegetation and thus improve safety for recreationists and residents.

### *Geographic Boundary*

The geographic area or spatial bounds for the cumulative effects to scenery resources is determined by typical experience of the viewers. There are local viewers who utilize the Tollgate Mountain area for various recreation experiences and there are travelers who experience the Tollgate Mountain area as they travel through via Hwy 204. The visual experience is the forested setting of Tollgate Mountain from the western edge near Weston Pond to the eastern edge near the junction of the Summerville road. The southern and northern edges are the breaks of the three major drainages that surround the area: Lookingglass Creek, South Fork Walla Walla River, and the North Fork Umatilla River. This geographic boundary is determined by the viewing distance to which activities can be visually discerned and the setting in which the project is within.

### *Temporal Boundary*

The temporal bounds are related to the longevity of visual impacts of the reasonable and foreseeable activities in the geographic boundary. Visual impacts that can be discerned from a middleground to background viewing distance are of such scale that the effects could overlap spatially therefore these are the visual impacts to be considered. Timber harvest that creates unnaturally shaped or sized opening via clearcutting or textural contrasts that are not in keeping with the historical range of variability are generally used as examples of harvest effects that may temporally overlap. Once an opening has revegetated and reached a height of 20 feet, the visual impact has been mitigated or restored. Within this area the height of 20 feet can be reached within 20 to 30 years depending on the topography, aspect and climate. Therefore, 30 years is the temporal bounds for the cumulative analysis of effects.

# Affected Environment

## *Scenic Integrity*

Scenic Integrity is measured on the Umatilla National Forest through Visual Quality Objective levels defined by the USFS Visual Management System's Chapter 1 USDA Handbook # 462. These levels and descriptors of how people perceive them are shown below in Table 3-41.

**Table 3-41 — Visual Quality Objective and their interpretations**

| Visual Quality Objectives | Scenic Integrity as people perceive it |
|---|---|
| Preservation | Unaltered , visually complete or intact |
| Retention | Unnoticeably altered |
| Partial Retention | Slightly altered |
| Modification | Moderately altered |
| Maximum Modification | Heavily altered |
| Unacceptable Modification | Unacceptably altered |

### Sensitive Routes and Areas

The routes identified in the Forest Plan as sensitive level 1 for visual concerns are Hwy 204, and the 6400 Rd. The 6401 Rd is identified in the Forest Plan as a sensitivity level 2.

#### *Hwy 204*

The views from Hwy 204 are primarily foreground views of a timbered landscape. Some views into the Umatilla River drainage are afforded where the highway traverses the edge of the head of the draw. Langdon Lake is visible from the highway. The shores are lined with homes. The lodge and facilities of the Spout Spring Ski Resort are within the foreground view of Hwy 204. Much of the route has a "tunnel effect" that is created by consistently dense foreground vegetation that limits views beyond the roads edge. There are very few opportunities for views of beyond the edge of the road.

#### *Forest Road 6400*

Forest Rd 6400 departs from Hwy 204 at Langdon Lake, heading to the east to access Jubilee Lake, and Target Meadows Campground. The views from this road are initially timbered, and then open up to overlook the steep drainages of the Walla Walla River. The slopes are patterned with grasslands and timbered draws. Distant views of the Wallowa Mountains are available from the Bald Mountain

Viewpoint. The panoramic view from this viewpoint is comprised of the timbered head of Looking Glass Creek that becomes increasingly steep with grasslands and timbered stringers in the bottom of the draw. There is some evidence of past management activity along this road, as well as views of the powerline which includes a large linear clearing the entire length of the route. These visual evidences are not the dominant element of the views along this road, however at some locations dominate elements exist.

#### *Forest Road 6401*

The 6401 Rd is located within a timbered landscape that affords primarily foreground views of mixed conifer. The road provides access to the Target Meadows Campground and Burnt Cabin Trailhead. The campground lies around a wet meadow amidst timbered stands. The road is crossed by the powerline, and some management activity is evident.

#### *Spout Springs Recreation Residence Area*

The residential area along Hwy 204 sits amidst the timbered ridge that divides the Umatilla and Walla Walla river drainages. Many of the residents enjoy views across the drainages that are comprised of timbered draws and grassy slopes. In the Walla Walla drainage there are instances of horizontal basalt rim.

#### *Langdon Lake Recreation Residence Area*

Langdon Lake is a bounded and managed by the Langdon Lake Homeowner's association. Residences at the lake enjoy shoreline views of the lake. This viewshed is equally dominated by the lake, and the houses that line the shore. Views to the exterior of the built perimeter are dominated the timber stands, and the highway that runs adjacent to the homes on the north side of the lake.

#### *Tollgate Recreation Residence Area*

Residences in the Tollgate Recreation Residence area are located along Hwy 204 within a timbered landscape that is limited primarily to foreground views except were residences sit at the head of Elbow Creek and Couse Creek. The timbered surrounding are densely vegetated which is visually restrictive, but yet provides screening and privacy.

#### *Umatilla Breaks Viewpoint*

This viewpoint is not well developed and is rarely utilized, but the view from this vantage point is a dramatic scene from the head of the North Fork of the Umatilla River of steep drainages with grassland slopes and timbered north aspects and stringers.

### *Scenic Stability*

A new scenery indicator has been developed for use within the USFS Scenery Management System (applied in this analysis according to procedures described in the 9/20/06 Draft Appendix J of the SMS Handbook #701). Scenic stability is the degree to which the desired scenic character can be sustained through time and ecological progression. For the Tollgate project area, the existing scenic stability analysis focuses on the single major scenery attribute of vegetation, addressing its ecosystem conditions identified by field observation stand data. Ecosystem changes to other minor scenery attributes such as landform, rock outcrops, and winter snowfall are not as critical to the project area's scenic character as its vegetation, since these changes are relatively stable over time regardless of fire behavior and human activities.

Evaluating scenic stability is done by considering conditions necessary to sustain desired scenic character of stands within the natural and historic range of the landscape. Appropriate stand density, species composition, and fuel loads are necessary for stands to maintain the inherent characteristics through their lifecycle. When trends such as increasing stand density, encroachment of less resilient species, increasing fuel loads, and high levels of mortality exist, the expected consequences are change in the scenic character that are beyond the historic scale. Examples of these consequences are large canopy openings from intense wildfires, large stands of dead and dying timber, and loss of distinctive characteristic such as open, large tree character pine stands, lodgepole stand mosaics and multi-layered mixed species stands. Gradual trends over time have altered the species composition, stand structure, and age classes of the forest vegetation. In some cases where public safety is a concern, stand resiliency may require more aggressive measures to maintain defensible ingress and egress for both the public and firefighters.

### Scenic Stability Level Definitions

- Very High Stability—All dominant and minor scenery attributes of the valued scenic character are present and are likely to be sustained.
- High Stability—All dominant scenery attributes of the valued scenic character are present and are likely to be sustained. However, there may be scenery attribute conditions and ecosystem stressors that present a low risk to the sustainability of the dominant scenery attributes.
- Moderate Stability—Most dominant scenery attributes of the valued scenic character are present and are likely to be sustained. A few may have been lost or are in serious decline.
- Low Stability—Some dominant scenery attributes of the valued scenic character are present and are likely to be sustained. Known scenery attribute conditions and ecosystem stressors may seriously threaten or have already eliminated the others.
- Very Low Stability—Most dominant scenery attributes of the valued scenic character are seriously threatened or absent due to their conditions and ecosystem stressors and are not likely to be sustained. The few that remain may be moderately threatened but are likely to be sustained.
- No Stability—All dominant scenery attributes of the valued scenic character are absent or seriously threatened by their conditions and ecosystem stressors. None are likely to be sustained, except relatively permanent attributes such as landforms.

For the Tollgate Fuels Reduction project area, the existing Scenic Stability analysis focuses on the single major scenery attribute of vegetation, addressing its ecosystem conditions and stresses identified by field observation and stand data.

The greatest hazard to scenery resources and public safety in this area are large stand replacement fires that would burn much more intensely due to the stocking levels, species compositions, ladder fuels and canopy closure that have developed over time.

Table 3-42 shows the number of acres within each fire regime, and what condition those acres are in based on the stand density, species composition and fuel loads.

**Table 3-42 — Existing Fire Regime Condition Class Acreages**

| Fire Regime | Condition Class 1 | Condition Class 2 | Condition Class 3 | Fire Regime Total Acres |
|---|---|---|---|---|
| **I** | 82 | 231 | 1047 | 1360 |
| **II** | 3427 | 21050 | 0 | 24477 |

| | | | | |
|---|---|---|---|---|
| **III** | 0 | 8612 | 0 | 8612 |
| **IV** | 1088 | 3264 | 6527 | 10879 |
| **Condition Class Total Acres** | 4596 | 33157 | 7574 | 45328 |

The **FRCC I (Low)** corresponds to the definitions for "High" and "Very High" Scenic Stability levels described above. They both should have scenery attribute conditions that are within the range of natural or historic variability.

**FRCC II (Moderate)** corresponds to the definitions for "Moderate and Low" scenic stability. They both include conditions outside the range of natural or historic variability.

**FRCC III (High)** corresponds to the definitions for "Very Low" and "No" Scenic Stability. They are far beyond the range of natural or historic variability. (Appendix J, pg. 12)

### Scenic Stability Summary

These conditions are rated at low to moderate scenic stability because known scenery attributes such as the open stands of ponderosa pine, and larch are threatened by uncharacteristic fire and insects and disease due to these conditions. Conditions that currently exist in this topographic location where fires can run up the drainages and onto the plateau pose a moderate to high risk of large stand replacement fire that is more severe than the historical range.

## *Desired Scenic Character*

### Broad landscape

The Blue Mountains provide a mosaic of coniferous timber and grasslands. The steep grassland slopes are vertically punctuated by the timbered stringers. The broad upper plateaus are a timbered mosaic with openings in the form of meadows and bald escarpments. The mixed conifer stands provide multi-layered characteristics and small openings create a mosaic across the timbered landscape. The Tollgate area scenery is heavily influenced heavily by the steeply incised canyons. The basalt rock formations provide strong vertical features on the steep slopes. The deciduous vegetation in the riparian areas provides fall color and textual diversity, as well as shade for recreation sites. The major scenic attributes are the timbered vegetation that is diverse and viable, the streams and the riparian deciduous vegetation, and the steep mountainous terrain. The minor scenic attributes are the rock outcrop formations.

### Scenic Character Context

The Blue Mountains section is the western most section of the Middle Rocky Mountain Steppe. The terrain has been formed by metamorphic and volcanic activity which developed mountainous landforms. Today, the mountains are dissected by glacial and fluvial erosion processes. The project area is dissected most prominently by the North Fork Umatilla river drainage, and Looking Glass Creek. Coniferous vegetation spreads across the broad ridge tops, down the drainages and across north facing slopes. South and west facing terrain is often open grassy slopes. Riparian vegetation along streams is deciduous poplar, alder and willow. Basalt rock outcrops accentuate the steep faces of the stream corridors. Culturally, the area has been utilized by Native American tribes which utilized burning practices to improve the production of berries, big game forage, and to drive game.

### Scenic Attractiveness

"Scenic attractiveness is the primary indicator of the intrinsic scenic beauty of a landscape and of the positive response it evokes in people."[18] Based on commonly held perceptions of the beauty of landform, vegetation pattern, composition, surface water characteristics, and land use patterns and cultural features, the scenery is rated on a three point scale:

Class A – Distinctive, where landform, vegetation patterns, water characteristics and cultural features combine to provide unusual, unique or outstanding scenic quality.

Class B – Typical, where landform, vegetation patterns, water characteristics and cultural features combine to provide ordinary or common scenic quality.

Class C – Indistinctive, where the landscape does not have characteristics that add to the variety, unity, vividness, mystery, intactness, order, harmony or uniqueness of the scenery.

The Tollgate project area has areas of Class B and Class C scenic attractiveness. The scenic attractiveness rating is applied to the process of evaluating the value of the area's scenery resource.

### Landscape Visibility

The area roads provide varying degrees of visibility of the project units (Table 3-43). These roads are assigned sensitivity levels in the Forest Plan. These concern levels are the measure of the degree of public importance placed on landscapes viewed from travel ways and use areas. Levels are attributed by use levels, viewer interest in scenery and duration of view." The sensitivity levels are used to determine the appropriate visual quality objective for areas visible from the particular road or use area.

**Table 3-43 — Travel Route Sensitivity Levels**

| Road | Sensitivity Level |
|---|---|
| Hwy 204 | 1 |
| FS RD 6400 | 1 |
| FS RD 6401 | 2 |

This project is located in a steeply dissected landscape. Therefore the visibility is variable. The steep slopes of the Lookingglass Creek, the South Fork Walla Walla and North Fork Umatilla drainage are only visible where Hwy 204 crosses the very head of the drainage and openings in the foreground timber occur. Most units that are beyond the foreground of the open roads have very little visibility. The timber along these roads limits visibility, and project units would be seen for short durations as one traverses the road. The following table displays the sensitivity level of each road identified in the Forest Plan.

Visibility from campgrounds and the recreation residences around Langdon Lake, the Spout Springs Summer homes and the clusters of cabins located within private in-holdings is also a consideration. These views are of longer durations and are often repeat viewings.

Views from Bald Mountain Viewpoint are dominated by the Looking Glass drainage in the fore and mid ground views. The plateau across the drainage is visible at a very oblique view.

### Scenic Classes

Scenic classes are derived from the scenic attractiveness, visibility and sensitivity levels (Table 3-44). The scenic classes are a system of classification describing the importance or value of a particular landscape or portions of the landscape. Scenic classes range from class 1 being of very high value, to Class 7 being of low value. The forest has inventoried and classified the forest lands, and assigned visual quality objectives by scenic class. Class 1 was given a VQO of Preservation.

**Table 3-44 — Scenic Class, Visual Quality Objective and Scenic Integrity Level**

| Scenic Class | Visual Quality Objective | Scenic Integrity Level |
|---|---|---|
| 1 | Preservation | Very High |
| 2 | Retention | High |
| 3 | Partial Retention | Moderate |
| 4 | Modification | Low |
| 5 | Maximum Modification | Very Low |
| 6 | Unacceptable Modification | Unacceptably Low |

#### *Scenic Integrity*

The desired scenic integrity is a low degree of human caused disturbance that detracts from the scenic character, where the natural beauty of the area is the dominant visual image.

#### *Scenic Stability*

The desired scenic stability is a condition in which the scenery resources are resilient to uncharacteristic occurrences that reduce or eliminate the scenic attributes of the area. The vegetation stand density and species composition are with historical range. The fuel loads are minimal, not posing a risk of high flame lengths that would result in large spread crown fires. This scenic stability rating would be moderate to high.

# WILDERNESS AND UNDEVELOPED LANDS

## Introduction and Background

This section of the EIS discloses the affected environment and environmental consequences for North Fork Umatilla Wilderness; Lookingglass and Walla River Inventoried Roadless Areas (IRAs); potential wilderness areas (PWAs); and remaining other undeveloped lands. These four resource topics are grouped and discussed together because they share a complicated set of terminology and interrelated history. The following paragraphs of this section are included to help the reader understand the context of this analysis. Appendix H of this EIS discloses additional narrative and maps in support of this topic. Wilderness and Roadless Areas in PNW Region, Umatilla NF, Walla Walla RD and Tollgate Fuels Reduction project planning area are summarized below in Table 3-45

The USDA Forest Service, Pacific Northwest Region (Region 6) covers approximately 27.2 million acres within the states of Oregon and Washington. This represents approximately 27% of the total acreage of both states combined. These 27.2 million acres are allocated and managed based on the land allocations designated within the respective National Forest Land and Resource Management Plan. However, two types of land designations are overriding and common among all units within the region (indeed the nation), these are the management of Wilderness areas and the management of Inventoried Roadless

Area. In Region 6, there are approximately 4 million acres of Inventoried Roadless Areas (15%) and approximately 5 million acres of Wilderness (18%).

The Umatilla National Forest is one of 16 administrative units that manages the National Forest System lands within the Pacific Northwest Region. The Umatilla NF covers approximately 1.4 million acres and is situated in the northeastern corner of Oregon and southeastern corner of Washington State. The Umatilla National Forest contains 303,000 acres of wilderness (21%) and 282,000 acres of Inventoried Roadless Areas (20%). The Forest consists of four Ranger Districts one of which is the Walla Walla Ranger District.

The Walla Walla Ranger District is about 360,000 acres in size and contains 20,300 acres of Wilderness (6%) and 133,190 acres of Inventoried Roadless Areas (37%). The Tollgate Fuels Reduction project area occurs in the central portion of the Walla Walla District and the southern portion of the project area abuts the North Fork Umatilla Wilderness. Portions of the Walla Walla River and Lookingglass IRAs occur within the project planning area. The site specific analysis for the Tollgate Fuels Reduction project identified an additional 8,455 acres of lands that had no history of development and were subsequently classified using the criteria discussed later in this section.

**Table 3-45 — Contextual Display of Wilderness and Roadless Areas in PNW Region, Umatilla NF, Walla Walla RD and Tollgate Fuels Reduction project planning area**

| Unit | Acres | Percentage |
|---|---|---|
| Pacific Northwest Region | 27.2 million | 27%[15] |
| • **Wilderness** | 5 million | 18% |
| • **Inventoried Roadless Area** | 4 million | 15% |
| Umatilla National Forest | 1.4 million | 5%[16] |
| • **Wilderness** | 303,000 | 21% |
| • **Inventoried Roadless Area** | 282,000 | 20% |
| Walla Walla Ranger District | 360,000 | 26%[17] |
| • **Wilderness** | 20,300 | 6% |
| • **Inventoried** | 133,190 | 37% |

[15] Percentage represents the portion (acres) of both Oregon and Washington that are National Forest System lands.

[16] Percentage represents the portion (acres) of US Forest Service Pacific Northwest Region that is managed by Umatilla National Forest.

[17] Represents the portion (acres) of Umatilla National Forest that is managed by the Walla Walla Ranger District

| Roadless Area | | |
|---|---|---|
| Tollgate Fuels Reduction Project Planning Area | 46,464 | 13%[18] |
| • **Wilderness** | 12,571 | 27%[19] |
| • **Inventoried Roadless Area** | 10,695 | 23% |
| • **Other lands that have undeveloped character** | 8,455[20] | 18% |

During public involvement for this project, and in past similar projects, a wide range of terms have been used by respondents, the courts, and the Forest Service when referring to these topics such as Roadless, unroaded, uninventoried Roadless, undeveloped areas, and Roadless expanse.

From the mid-1970s through 2001 the Forest Service maintained a Roadless area inventory of undeveloped lands that we used and updated for RARE, RARE II, and in support of Land and Resource Management Planning completed in 1990 for Umatilla National Forest. All during that time we called these polygons "Roadless areas" or "Inventoried Roadless Areas" (IRAs). With completion of the Roadless Area Conservation Rule (RACR) in 2001 these lands ceased being just an inventory, and IRAs became more of a designation, with fixed boundaries and prohibitions set by Forest Service regulation (36 CFR 294). Confusion ensued because two Forest Service maps used the same name; IRA. One map had fixed boundaries set by the RACR and another map had changeable boundaries based on inventory criteria.

To address this situation, the Forest Service created a new term for their inventory of undeveloped lands called "potential wilderness areas" (PWAs) to make a clear distinction between the IRA term used by the 2001 RACR. This terminology addition was made policy by changing the 2006 handbook for wilderness evaluation (FSH 1909.12, Chapter 70) and is also reflected in the 2008 Forest Service NEPA regulations (36 CFR 220). In the regulations, potential effects to "Inventoried Roadless Areas" and "potential wilderness areas" are factors in determining whether a CE, EA, or EIS is the appropriate NEPA document for a particular project. The term "other undeveloped lands" is presented and used in this document to provide a consideration for the balance of those remaining lands that did not meet the inventory criteria for a PWA, were not designated an IRA under the RACR, and do not contain roads and evidence of timber harvest (see definitions below).

[18] Represents the portion (acres) of the Walla Walla Ranger District that occurs within the boundary of the Tollgate Fuels Reduction project planning area.

[19] Represents the portion of The North Fork Umatilla Wilderness that occurs within the Tollgate Fuels Reduction project planning area, however, no fuels activities are proposed in the Wilderness.

[20] This number reflects the Potential Wilderness Areas (PWAs) acreages and other undeveloped lands, minus the IRA/PWA acreage.

To resolve this confusion the Forest Service uses its discretion to rely on agency policy, agency definitions of terms, and agency procedures for the inventory of resources and facilities. Inventory criteria and procedures for potential wilderness areas are found in Forest Service Handbook 1909.12, Chapter 71.

The terms and definitions as stated below will be used in this site-specific analysis. The four resource topics are based on current law, regulation, agency policy, and Umatilla Land and Resource Management Plan (Forest Plan), as amended

1. **Wilderness:** A wilderness area is designated by congressional action under the Wilderness Act of 1964 and other wilderness acts. Wilderness is undeveloped Federal land retaining primeval character and influence without permanent improvements or human habitation (Umatilla Forest Plan, page GL-45).
2. **Inventoried Roadless Areas (IRA)**: These areas were identified in the 2001 Roadless Area Conservation Rule in a set of inventoried Roadless area maps, contained in Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps (36 CFR 294.11). These areas were set aside through administrative rulemaking and have provisions, within the context of multiple use management, for the protection of Inventoried Roadless Areas. Most IRA boundaries are substantially identical to those identified as “Roadless Areas” referred to in the 1982 planning rule (36 CFR 219.17) and identified by the Forest Plan, FEIS, Appendix C; however some localized, minor differences in boundaries may exist.

   All Roadless area acres were allocated to various management area strategies as disclosed in the Umatilla Forest Plan FEIS, Appendix C and described in the Record of Decision (page 6-9) for the FEIS. Some management area strategies were intended to retain the undeveloped Roadless character of the Roadless area and some management area strategies were intended to develop the lands with timber harvest and road building activities; thus forgoing Roadless character.
3. **Potential Wilderness Area (PWA)**: Areas of potential wilderness identified using inventory procedures found in Forest Service Handbook (FSH) 1909.12, Chapter 71 are called potential wilderness areas. The inventory is conducted by the Forest Service with the purpose of identifying potential wilderness areas in the National Forest System. The National Forest System Land and Resource Management Planning Rule (currently the 1982 Rule, 36 CFR §219.17) directs that Roadless areas be evaluated and considered for wilderness recommendation during the forest planning process.

   Potential wilderness areas (PWAs) are not a land designation decision, they do not imply or impart any particular level of management direction or protection, they are not an evaluation of potential wilderness (FSH 1909.12,Chapter 72), and lastly, they are not preliminary administrative recommendations for wilderness designation (FSH 1909.12, Chapter 73). The inventory of PWAs does not change the administrative boundary of any inventoried Roadless area (IRA) or any congressionally designated wilderness.

   Typically, PWAs substantially overlap, and/or are contiguous with Inventoried Roadless Areas. PWAs may also be contiguous with designated wilderness. Some newly inventoried PWAs may be stand-alone areas that were not identified as “Roadless areas” in Appendix C of the 1990 Umatilla Forest Plan and “Inventoried Roadless Areas” as identified in a set of maps in the 2001 Roadless Area Conservation Rule (RACR). PWAs overlap Inventoried Roadless Areas only where those acres of land are consistent with the inventory criteria (FSH 1909.12, Chapter 71) and may extend beyond IRA and wilderness boundaries consistent with inventory criteria.

4. **Other undeveloped lands**: These acres of land have no history of harvest activity, do not contain forest roads[21] and are not designated as a wilderness area or inventoried as a potential wilderness area.

Appendix H of this document describes the methodology and rationale used to inventory and identify PWAs within the Tollgate Fuels Reduction project planning area (46,464 acres) and PWA analysis area (52,284 acres). Maps included in Appendix H (maps H-2 to H-5) show a visual progression of the inventory process, final results, and proposed project activity, if any, that would occur in these areas.

The effects to wilderness, Inventoried Roadless Areas (IRAs), potential wilderness areas (PWAs), and other undeveloped lands were based on maps and polygons [22]created using agency inventory procedures (Appendix H) and are considered and disclosed below in this chapter of the EIS. There are some PWAs that are contiguous to the North Fork Umatilla Wilderness and effects to these acres are analyzed with the wilderness section. Effects to the Lookingglass and Walla Walla River IRAs are analyzed within the IRA section. PWAs, which include the Lookingglass and Walla Walla River IRAs and PWAs contiguous to the IRAs, are analyzed in the Lookingglass and Walla Walla River PWA section.

An outcome of the PWA inventory process was the identification of isolated polygons of other undeveloped lands (Table H-1B). All but one of these polygons did not meet inventory criteria as PWAs and they are not Inventoried Roadless Areas or a designated wilderness area. Each individual polygon of isolated land has no history of harvest activity and does not contain forest roads. They are stand-alone polygons of varying acreages all less than 4,999 acres within the project planning area. All polygons less than one (1) acre were considered in the inventory process but dropped from detailed study because individual polygons this small cannot be preserved due to physical terrain and natural conditions and they do not have self-contained ecosystems, such as an island. Detailed information regarding the inventory process and methodology used for the Tollgate Fuels Reduction project analysis, along with maps and tables is located in Appendix H of this document.

See Appendix I of this report for consideration of an inventory map submitted by Hells Canyon Preservation Council. These maps were submitted as comments on the Tollgate Fuels Reduction project proposal.

## North Fork Umatilla Wilderness and contiguous Potential Wilderness Areas (PWAs)

### *Background*

A wilderness area is designated by congressional action under the Wilderness Act of 1964 and other wilderness acts. The North Fork Umatilla Wilderness was added to the National Wilderness Preservation System, June 26, 1984, through enactment of Congress of Public Law 98-328, The Oregon Wilderness

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[21] **Forest road** – A road wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. Road – A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36CFR §212.1)

[22] **Polygon** – On a map or in a geographic information system (GIS), a series of line segments defined by x and y geographical coordinates (vectors) that completely enclose an area.

Act of 1984. The Forest Plan management area allocation for the North Fork Umatilla Wilderness is B1-Wilderness (timber harvest and road building are not allowed).

Areas of potential wilderness are identified using inventory procedures found in Forest Service Handbook (FSH) 1909.12, Chapter 71 are called potential wilderness areas. The PWA inventory is conducted with the express purpose of identifying all lands that meet the criteria for being evaluated for wilderness suitability and possible recommendation to Congress for wilderness study or designation. The PWA inventory for the Tollgate Fuels Reduction project includes a review of all acres within and adjacent to the project planning area. Areas of past harvest where logging is evident and locations of forest roads were identified using GIS data and local knowledge and professional judgment. All polygons less than one (1) acre were considered in the inventory process but dropped from detailed study because individual polygons this small cannot be preserved due to physical terrain and natural conditions and they do not have self-contained ecosystems, such as an island. As mentioned in the introduction to this section, detailed information regarding the inventory process and methodology used for the Tollgate Fuels Reduction project analysis, along with maps and tables is located in Appendix H of this document.

## *Scale of Analysis*

North Fork Umatilla Wilderness and contiguous potential wilderness areas (PWAs) within the Tollgate Fuels Reduction project planning area.

### Indictors for comparison purposes between alternatives are:

The Definition of Wilderness from Section 2(c) of the 1964 Wilderness Act was used to identify four qualities of wilderness related to wilderness character that will be used to compare alternatives.

Wilderness indicators are as follows*:*

- *Untrammeled, Undeveloped, and Natural* – The Wilderness Act states that wilderness is “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements of human habitation; and generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable.”
- *Outstanding opportunities for solitude and remo*teness – The Wilderness Act states that wilderness has “outstanding opportunities for solitude or a primitive and unconfined type of recreation.”

Indicators for PWAs:

- *Roadless characteristics* (features that are often present in and characterize Inventoried Roadless Areas) as identified in the 2001 Roadless Area Conservation Rule (36 CFR §294.11)
    - High quality or undisturbed soil, water, and air
    - Sources of public drinking water
    - Diversity of plant and animal communities
    - Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land
    - Primitive, semi-primitive, non-motorized and semi-primitive motorized classes of dispersed recreation
    - Reference landscapes

    - Natural appearing landscapes with high scenic quality
    - Traditional cultural properties and sacred sites and
    - Other locally identified unique characteristics
- *Change in acres of inventoried PWAs*

### Affected Environment

North Fork Umatilla Wilderness is located on the Walla Walla Ranger District and encompasses approximately 20,256 acres within the state of Oregon. Approximately 12,571 acres are within the project planning area. No project activities are proposed to occur in the North Fork Umatilla Wilderness (See maps in Appendix H).

Within the project planning area there are 1,151 acres of inventoried potential wilderness areas (PWAs) that are contiguous with the designated North Fork Umatilla Wilderness. Project activities are proposed in some of the associated inventoried PWAs contiguous to the wilderness under Alternative B.

## Lookingglass Inventoried Roadless Area (IRA) and Walla Walla River IRA

### Background

The Lookingglass and Walla Walla River Inventoried Roadless Areas (IRAs) are identified and mapped in Appendix C of the Umatilla Forest Plan and are also identified in the set of maps for Inventoried Roadless Areas (IRAs) in the Forest Service Roadless Area Conservation FEIS, Volume 2, and dated November 2000. There is no meaningful difference between the boundary of the Roadless areas identified in Appendix C of the Forest Plan and the 2001 IRA boundaries; therefore, impacts to these two topics will be discussed together.

Overall resource management covered by Umatilla Forest Plan is comprised of management goals, objectives, Forest-wide standards and guidelines, and management area allocations (FP p. 4-1). The Roadless area issue is primarily addressed in the Forest Plan through management area allocations (FP p. 3-5).

### Scale of Analysis

The scale of analysis is the Tollgate Fuels Reduction project planning area, and the entire Lookingglass and Walla Walla IRAs (part of each extends beyond the project planning boundary). Maps depicting the IRA's can be found in appendix H.

**Indicators for comparison purposes between alternatives are:**

- *Roadless characteristics* (features that are often present in and characterize Inventoried Roadless Areas) as identified in the 2001 Roadless Area Conservation Rule (36 CFR §294.11)
    - High quality or undisturbed soil, water, and air
    - Sources of public drinking water
    - Diversity of plant and animal communities

- Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land
- Primitive, semi-primitive, non-motorized and semi-primitive motorized classes of dispersed recreation
- Reference landscapes
- Natural appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites and
- Other locally identified unique characteristics

## *Affected Environment*

### Lookingglass IRA

The Lookingglass IRA is approximately 4,859 acres in size. Approximately 73% of the Lookingglass IRA is within the project planning area (3,555 acres).

The Looking glass IRA is situated northeast of the Spout Springs Ski Area and includes nearly the entire Lookingglass Creek canyon. The area is accessed from the northwest from Forest Road 64 and northeast by Forest Road 63; the southeast by Forest Road 3701; and from the southwest by State Highway 204. A two mile trail section of trail #3232 is the only maintained trail in the IRA. The North Fork Umatilla Wilderness lies less than one mile to the west across highway 204. Ownership of the area east of the forest boundary is private land. A pacific Power and Light Company transmission line forms 2.5 miles of boundary on the northeast side. Private land forms part of the boundary on the north side as well.

The Landscape is typical for the northern Blue Mountains. Elevation ranges from 3,000 feet where Lookingglass leaves the forest to 5,200 feet on the northeast edge of the area at Bald Mountain. A little more than half of the area is composed of slopes greater than 60%, while about 11% has slopes less than 30%.

White fir, grass and subalpine fir comprise the predominant ecosystems, which has a mean annual precipitation of 45-55 inches. North facing slopes are primarily timbered with white fir and mixed conifer at lower elevations and subalpine fir at higher elevations. Higher elevation south facing slopes are marked by timbered stringer draws and grasslands. Riparian areas along the Lookingglass and Eagle creeks contain stands of ponderosa pine and mixed conifer.

There are no primary attractions within the Lookingglass area. An attribute is its location adjacent to the Spout Springs Ski Area and Lugar Springs campground.

**Forest Plan**: Approximately 65 percent of the Lookingglass IRA is allocated to Forest Plan management area A2-OHV Recreation. The goal for this management area is to provide motorized recreation in a predominately natural or natural appearing environment with a moderate degree of isolation from sights and sounds of human activity. The Desired Future Condition is for moderate to large naturally appearing areas to remain generally undeveloped (no logging but some constructed 4-wheel drive ways). Recreationists would be able to enjoy a variety of challenging off-highway vehicle (OHV) opportunities on trails or driveways, without standard developed roads or concentrations of people. Management Standards and Guides of recreation include managing the area to keep contacts between users low to moderate. Access would be mostly for remote motorcycle or ATVs and some walk-in activities. (FP p.4-7).

Nearly 15 percent of the IRA is allocated to Forest Plan management area C4-Wildlife Management. The next largest Forest Plan management areas allocation is A3-Viewshed 1(approximately 5%) with less than 5% allocation in each of the remaining acres in management areas, A5-Roaded Natural, A6-Developed Recreation, A9-Special Interest Area, C1-Dedicated Old Growth, C2-managed Old Growth, C5C5-Riparian (Fish and Wildlife) and E2 Timber and Big Game. (FP pp 4-95 – 4-187). See Table 3-46. See Map H-9.

**Table 3-46 — Lookingglass IRA by Umatilla Forest Plan Management Area Allocations**

| Management Area | Acres of IRA located in each MA | Percent of IRA in each MA* |
|---|---|---|
| A2 | 3,162 | 65.1% |
| A3 | 258 | 5.3% |
| A5 | 5 | 0.1% |
| A6 | 29 | 0.6% |
| A9 | 42 | 0.9% |
| C1 | 128 | 2.6% |
| C2 | 224 | 4.6% |
| C4 | 694 | 14.3% |
| C5 | 94 | 1.9% |
| E2 | 221 | 4.6% |
| **Total** | **4,859** | 100% |

**Naturalness and Undeveloped Character:** Human influences have had limited impact on the natural appearance and long-term ecological processes of the Lookingglass area. Natural balances, even where altered in the past, are intact and operating. While these intangible values may have been disrupted in the past by activities such as fire and grazing, the activities are minimal in both extent and duration. Fire has been, and most likely would continue to be, the factor with the potential to impact the naturalness of the area. However, fire has been the key to the long-term ecological changes and vegetative succession of the area.

The spirit of adventure and awareness, serenity, and self-reliance exist within the area. However, private land, roads and timber harvest activities outside the IRA may present nonconforming sights and sounds to parts of the Roadless area. Encounters with motorbikes on the trails reduce the opportunity for solitude and a primitive experience. With the exception of motorcycles traveling Trails #3232, nonconforming sights and sounds are rare within the deep canyons.

**Recreation:** Primitive recreation opportunities include cross-country hiking, motorcycle riding, mountain biking, horseback riding, and hunting. Hunting activity is minor for upland game birds and moderate for big game deer and elk. Some trout fishing occurs. Trail #3232 receives moderate use from hikers, motorcyclists, mountain bikers and horseback riders. No established campgrounds exist in the area, and there is no potential for developing any sites. Several dispersed campsites are located on the perimeter and on Lookingglass Creek near the trail bridge, which receives moderate use during the fall hunting season. The Roadless area is adjacent to the Spout Springs Ski Area.

**Wildlife:** The area provides excellent summer range for big game, has extensive old-growth habitat, and contains high levels of dead and down woody habitat.

**Water and Fish**: The Lookingglass area contains most of Lookingglass Creek within the Forest Boundary; from near the mouth of Eagle Creek upstream to near its headwaters at Langdon Lake. It includes the lower portions of Summer and Lost creeks as well as the area where the springs arise from the banks and streambed to increase stream flow forty-fold over a distance of a few hundred yards. Water temperature in this section of the creek stays in the mid-40s year-round. Lookingglass Creek has a cooling effect on the Grande Ronde River, decreasing the temperature by about 10 degrees at their confluence in mid-summer.

ESA-listed (Threatened) Snake River steelhead, Snake River spring Chinook salmon, and Columbia River bull trout use this part of Lookingglass Creek. Most bull trout spawning happens in this part of Lookingglass Creek, which is also very important for spawning steelhead and Chinook salmon. The cold, clean water is also important for operation of the Lookingglass fish hatchery. Lookingglass Creek has been designated as Magnuson-Stevens Essential Fish Habitat.

**Range:** About one third of the Lookingglass IRA is within the North End Sheep Allotment (1600 acres).

**Cultural:** No known cultural resources have been inventoried.

**Land Use and Special Uses**: None at this time. There are no mining claims or oil and gas leases.

**Private Lands**: There are no intermingled private lands within the area. Two parcels of private land are located on the northern boundary.

### Walla Walla River IRA

The Walla Walla River IRA includes most of the south and north forks of the Walla Walla River that are within the Forest boundary. The IRA is approximately 34,416 acres in size. About 7,140 acres (20%) are located within the project planning area.

Several local roads provide access to the North Fork from the west, and Forest Road 65 accesses the North Fork from the north from Mill Creek off of County Road 582. County Road 600 provides access to the South Fork from the west. Forest Roads 64 runs north-south on the ridge separating the Walla Walla and Wenaha drainages and provides access to the upper reaches of both forks. Several trails access the interior of this unit, particularly Trail #3225, which runs from the Forest boundary for 16.5 miles along the South Fork Walla Walla River to Forest Road 65.

The Landscape is typical for the northern Blue Mountains. Elevation varies from 2,400 feet to 5,780 feet. It is mountainous with steep slopes and deeply incised canyons. Over half of this area is composed of slopes greater than 60 percent. Mean annual precipitation varies from 45 to 60 inches.

Predominant ecosystems are white fir and grass. Northern aspects are timbered with white fir and mixed conifer at lower elevations and subalpine fir at higher elevations. Southern aspects are predominantly timbered draws interspersed with grassland. Riparian areas contain stands of mixed conifer and ponderosa pine.

Human influences have had limited impact on the natural appearance or long-term ecological processes of the area. Fire has been, and most likely would continue to be, the factor with the most potential to impact the naturalness of the area. The North Fork Umatilla Wilderness lies about 2.5 miles to southwest across State Highway 204.

There are no key attractions in this area.

**Forest Plan**: Approximately 75 percent of the Walla Walla River IRA located within the project planning area is allocated to management area F4-Walla Walla River Watershed. The goal for this MA is to provide high quantity and quality water and elk habitat. The Desired future condition is for the north and south forks of the Walla Walla watershed to remain as a large, natural appearing, primarily undeveloped area. The area is to continue to provide high quantities and quality of water, undisturbed big game and wildlife habitat and recreation opportunities featuring closeness to nature and self- reliance. Some additional logging and timber management would be evident but only in area where past harvest has occurred. Management Area Standards and Guidelines: Recreation access would be primarily for remote off-highway (OHV) and walk-in or horseback opportunities on the undeveloped and parts of the developed area. (FP p. 4-191).

Approximately 13 percent of the IRA located within the project planning area is allocated to Forest Plan management area C1-Dedicated Old Growth. with remaining acres in management areas, A3-Viewshed 1, A9-Special Interest Area,C5-Riparian (Fish and Wildlife), and E2-Tiber and Big Game. (FP p. 4-95 – 4-187). See Table 3-47. See Map H-9.

**Table 3-47 — W alla Walla River IRA by Umatilla Forest Plan Management Areas**

| Management Area | Acres of IRA located in each MA | Percent of IRA in each MA* |
|---|---|---|
| A3 | 147 | 2% |
| A9 | 4 | 0.1% |
| C1 | 950 | 13.3% |
| C5 | 4 | 0.1% |
| E2 | 650 | 9.1% |
| F4 | 5,385 | 75.4% |
| **Total** | **7,140** | 100% |
| | | |

**Naturalness and Undeveloped Character:** The opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance do exist within this area due to its size. However, roads and timber harvest activities to the north, west, and south may present nonconforming sights and sounds to parts of the Roadless area. Encounters with motorbikes on the trails reduce the opportunity for solitude and a primitive experience.

**Recreation:** Opportunities for dispersed recreation exist for horseback riding, motorcycle riding, mountain bike riding, camping, hiking, fishing, and hunting. These recreational activities, with the exception of hunting, are all closely associated with the trail system of 40 plus miles within this IRA.

There are no developed campgrounds and no sites have been identified for campground development. There are numerous dispersed sites within this area, most of which are used during the hunting season. There is very limited potential for additional dispersed campsites because the desirable sites are already being used.

**Special Features:** Sabin‟s lupine, which is classified as endangered in Washington, has been inventoried near Bear Creek, Tollgate, and Bald Mountain. One small population of the regionally sensitive plant species Mingan moonwort grows near the South Fork Walla Walla trail.

**Wildlife:** Large stands of old growth habitat are well distributed. The South Fork Walla Walla River has been identified as vacant bighorn sheep habitat and may be the site of future transplants. Deer and elk winter at lower elevations and calve at the higher elevations.

**Water/Fish:** The watershed is an important source of high-quality water for downstream fisheries and irrigation. The South Fork of the Walla Walla River supports healthy populations of redband/rainbow trout, bull trout, mountain whitefish, sculpins, and anadromous steelhead and re-introduced Chinook salmon. This is a strong flowing stream with excellent aquatic habitat and clear water, which remains very cool year-round. It is widely recognized as an important bull trout stream as evidenced by several studies currently under way and by its designation as critical habit by the U.S. Fish and Wildlife Service. Bull trout and steelhead have also been reported in at least four of its tributaries.

The Steelhead and bull trout found in the South Fork of the Walla Walla River are both listed under ESA as Threatened. The South Fork of the Walla Walla River inside the National Forest provides excellent aquatic habitat for native fish species with woody debris, pools, spawning gravel, cover, and good quantities of cool, clean water. The South Fork of the Walla Walla River is also designated as Magnuson-Stevens Essential Fish Habitat.

Previous withdrawals for irrigation reduced downstream flows and made the lower river uninhabitable to native salmonids. Recent agreements with irrigators have partially restored downstream summer flows, which have persisted through the past two summers.

Private cabins at the Forest boundary are accessed by fording the river at 10 different locations, including driving up the riverbed 300 feet at two of the fords. The fords are all located downstream of the IRA.

A recreational trail parallels the river for almost its full length, but its impacts on the aquatic habitat are insignificant. The trail does not ford the river and is not closely adjacent to the water for most of its length. Two bridges cross the river at connecting trails.

The North Fork of the Walla Walla River is a much smaller stream, but it hosts redband/steelhead, sculpins, and perhaps occasionally, a few bull trout. The Walla Walla River has high-quality water, which has been maintained at potential by the current management strategy. The South Fork is spring-fed and maintains temperatures of less than 60 degrees throughout the year.

**Minerals:** This area has no known locatable mineral potential, but is considered prospectively valuable for oil and gas (Smith 1976).

**Cultural:** One unverified cultural resource site is known. The area was used by Indians for hunting and as a migration route so the potential for discovering other cultural sites is moderately good.

**Land use/Special Uses:** None at this time. There are no mining claims or oil and gas leases.

**Private lands:** None.

## Lookingglass and Walla Walla Potential Wilderness Areas (PWAs)

### *Background*

An inventory of Potential Wilderness Areas has been conducted for the Tollgate Fuels Reduction Project. Appendix H describes the process and rationale used to conduct the inventory. The inventory is based on, and consistent with criteria found at Forest Service Handbook (FSH) 1909.12 Ch. 71. The inventory is conducted with the express purpose of identifying all lands that meet the criteria for being evaluated for wilderness suitability.

Each step of the inventory process is visually documented as a map. These maps are displayed in appendix H. The Forest Service used professional judgment and local knowledge regarding unique, site-specific conditions of each area being considered for placement in the inventory of potential wilderness areas.

Potential wilderness areas are not a land designation decision, they do not imply or impart any particular level of management direction or protection, they are not an evaluation of potential wilderness (FSH 1909.12, Chapter 72), and lastly they are not preliminary administrative recommendations for wilderness designation (FSH 1909.12, Chapter 73). The inventory of potential wilderness does not change the administrative boundary of any Inventoried Roadless Areas (IRAs), any congressionally established wilderness, or any forest plan management areas.

Typically, PWAs substantially overlap and/or are contiguous with Inventoried Roadless Areas. PWAs may also be contiguous with designated wilderness. Some newly inventoried PWAs may be stand alone areas that were not identified as ‘Roadless areas’ in Appendix C of the 1990 Umatilla Forest Plan and ‘Inventoried Roadless Areas’ as identified in a set of maps in the 2001 Roadless Area Conservation Rule (RACR). PWAs overlap Inventoried Roadless Areas only where those acres of land are consistent with the inventory criteria (FSH 1909.12 Chapter 71) and may extend beyond IRA and wilderness boundaries consistent with inventory criteria.

***The Lookingglass PWA*** is comprised of the entire Lookingglass IRA and PWAs contiguous with the IRA.

***The Wall Walla River PWA*** is comprised only of the Walla Walla River IRA and PWAs contiguous with the IRA that is located within the Tollgate Fuels Reduction Project planning area. Note: A portion of the Walla Walla River IRA is located outside the project planning area and is not considered in the analysis because no project activities are proposed in or around that portion of the IRA.

***Other Isolated PWAs*:**

The PWA inventory identified only one PWA that was not contiguous to either of the IRAs or the North Fork Umatilla Wilderness. It is referred to as polygon 362 and is 1,087 acres in size. Polygon 362 is located northeast of the Lookingglass PWA separated by a high voltage powerline disturbance corridor. No project activities are proposed in or around polygon 362, therefore this area will not be analyzed any further.

**Forest Plan:** Overall resource management covered by Umatilla Forest Plan is comprised of management goals, objectives, Forest-wide standards and guidelines, and management area allocations (FP p. 4-1). The Roadless area issue is primarily addressed in the Forest Plan through management area allocations (FP p. 3-5).

## *Scale of Analysis*

The scale of analysis is the Tollgate Fuels Reduction project planning area, and the PWA analysis area. The PWA analysis area (52,284 acres) encompasses the entire project planning area (46,464 acres) and additional lands sufficient to ensure a complete PWA inventory around the entire Lookingglass IRA. This was needed to put in context any reduction in PWA associated with the Lookingglass IRA due to proposed activities.

The PWA analysis area was not expanded to encompass all of the lands surrounding the Walla Walla River IRA because no project activities were proposed in any of the alternatives that affect the Walla Walla River IRA or contiguous PWAs identified within the project planning area. See maps in Appendix H.

**Indicators for comparison purposes between alternatives are:**

- *Roadless characteristics* (features that are often present in and characterize Inventoried Roadless Areas) as identified in the 2001 Roadless Area Conservation Rule (36 CFR §294.11)
    - High quality or undisturbed soil, water, and air
    - Sources of public drinking water
    - Diversity of plant and animal communities
    - Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land
    - Primitive, semi-primitive, non-motorized and semi-primitive motorized classes of dispersed recreation
    - Reference landscapes
    - Natural appearing landscapes with high scenic quality
    - Traditional cultural properties and sacred sites and
    - Other locally identified unique characteristics
- *Change in acres of inventoried PWAs*

## *Affected Environment*

### Lookingglass PWA

The Lookingglass PWA is approximately 5,917 acres. It includes the Lookingglass IRA (4,859 acres) and PWAs that are contiguous to the Lookingglass IRA (1,058 acres). See Table H-1A.

The Lookingglass PWA setting is the same as the Lookingglass IRA setting described in the previous section and will not be repeated here.

**Forest Plan**: Approximately 54 percent of Lookingglass PWA is allocated to management area A2-OHV Recreation. The goal for this management area is to provide motorized recreation in a predominately natural or natural appearing environment with a moderate degree of isolation from sights and sounds of human activity. The Desired Future Condition is for moderate to large naturally appearing areas to remain generally undeveloped (no logging but some constructed 4-wheel drive ways). Recreationists would be able to enjoy a variety of challenging off-highway vehicle (OHV) opportunities on trails or driveways, without standard developed roads or concentrations of people. Management Standards and Guides of recreation include managing the area to keep contacts between users low to moderate. Access would be mostly for remote motorcycle or ATVs and some walk-in activities. (FP p. 4-97).

Approximately 19% of the PWA is allocated to C4-Wildlife habitat. The remaining acres of the Lookingglass PWA are allocated to; A1-Non-Motorized Dispersed Recreation, A5-Roaded Natural, A6-Developed Recreation, A9-Special Interest Area,C1-Dedicated Old Growth, C2-Managed Old Growth, C5-Riparian (Fish and Wildlife), and E2-Timber and Big Game. (FP p. 4-95 – 4-187). See Table 3-48. See Map H-9.

**Table 3-48 — Lookingglass PWA by Umatilla Forest Plan Management Areas**

| Management Area | Acres of PWA located in each MA | Percent of PWA in each MA* |
|---|---|---|
| A2 | 3,183 | 53.8% |
| A3 | 287 | 4.8% |
| A5 | 9 | 0.2% |
| A6 | 44 | 0.7% |
| A9 | 42 | 0.7% |
| C1 | 348 | 5.9% |
| C2 | 340 | 5.7% |
| C4 | 1,092 | 18.5% |
| C5 | 167 | 2.8% |
| E2 | 402 | 6.8% |
| **Total** | **5,719** | **100%** |

### Walla Walla River PWA

The portion of the Walla Walla River PWA defined for this analysis is about 7,248 acres. It includes the portions of the Walla Walla River IRA located within the PWA analysis area (7,140 acres) and PWAs contiguous to the IRA that are within the PWA analysis area (108 acres). See Table H-1A.

The Walla Walla River PWA setting is the same as the Walla Walla River IRA setting described in the previous section and will not be repeated here.

**Forest Plan**: Approximately 75 percent of the Walla Walla River PWA located within the project planning area is allocated to management area F4-Walla Walla River Watershed. The goal for this MA is to provide high quantity and quality water and elk habitat. The Desired future condition is for the north and south forks of the Walla Walla watershed to remain as a large, natural appearing, primarily undeveloped area. The area is to continue to provide high quantities and quality of water, undisturbed big game and wildlife habitat and recreation opportunities featuring closeness to nature and self- reliance. Some additional logging and timber management would be evident but only in area where past harvest has occurred. Management Area Standards and Guidelines: Recreation access would be primarily for remote off-highway (OHV) and walk-in or horseback opportunities on the undeveloped and parts of the developed area. (FP p. 4-191).

Approximately 13 percent of the IRA located within the project planning area is allocated to Forest Plan management area C1-Dedicated Old Growth. with remaining acres in management areas, A3-Viewshed 1, A9-Special Interest Area,C5-Riparian (Fish and Wildlife), and E2-Tiber and Big Game. (FP p. 4-95 – 4-187). See Table 3-49. See Map H-9.

**Table 3-49 — Walla Walla River PWA by Umatilla Forest Plan Management Areas**

| Management Area | Acres of PWA located in each MA | Percent of PWA in each MA* |
|---|---|---|
| A3 | 147 | 2% |
| A9 | 4 | 0.1% |
| C1 | 960 | 13.2% |
| C5 | 4 | 0.1% |
| E2 | 722 | 10% |
| F4 | 5,411 | 74.7% |
| **Total** | **7,248** | 100% |

Table 3-50 is a summary of all the acres evaluated in the PWA inventory process for this project. Information summarized for this table can be found in Appendix H, Tables H-1A, H-1B, H-1C and H1-D. Maps H-1, H-2, H-3, H-4 and H-5 are a visual representation of this inventory process.

**Table 3-50 — Potential Wilderness Area Inventory Summary**

| | Approximate Acres Tollgate Project Planning Area | Approximate Acres PWA Analysis Area |
|---|---|---|
| Map H-1; Total Acres Inventoried. Tollgate Project Planning area and PWA analysis area). | 46,464 | 52,284 |
| Map H-2; Acres Removed from inventory due to past harvest. | 14,878 | 16,894 |
| Map H-3; Acres removed from inventory due to activities related to roads | 10,364* | 11,690* |
| Map H-4; Resulting lands that remain after past harvest and activities related to roads are removed from inventory. (undeveloped lands) | 15,712** | 19,110** |
| Map H-5; Acres of Potential Wilderness Areas (PWAs) | **13,129**** | **15,403**** |
| Acres of undeveloped lands that did not meet PWA inventory criteria at FSH 1909.12 Chapter 71.1 (other undeveloped lands) | 2,584** | 3,709** |
| Lookingglass PWA (consists of the Lookingglass IRA and PWA contiguous to the IRA) | 3,660** | 5,917 ** |
| Walla Walla River PWA(consists of | 7,248** | 7,248** |

| | | |
|---|---|---|
| portions of the Walla Walla River IRA and PWA contiguous to the IRA) | | |
| PWA contiguous with North Fork Umatilla Wilderness | 1,151** | 1,151** |
| Isolated PWA (polygon 362) | 1,070** | 1,087** |
| Total PWA | **13,129**** | **15,403**** |
| *Some of these acres may overlap with acres of past harvest.<br>** This number does not include polygons less than one acre in size. | | |

The largest single PWA in this analysis is a portion of the Walla Walla River PWA at 7,248 acres followed by the Lookingglass PWA at 5,719 acres. Approximately 1,151 PWA acres are contiguous with the North Fork Umatilla Wilderness and there is one isolated PWA at 1,087 acres for a total of 15,403 acres of PWA within the PWA analysis area (Appendix H – Map H-5).

## Other Undeveloped Lands

### *Background*

An outcome of the PWA inventory process found at FSH 1909.12, Chapter 71 was the identification of isolated polygons of other undeveloped lands (see Appendix H, Map H-5, Table H-1B). These polygons did not meet inventory criteria as potential wilderness areas and they are not Inventoried Roadless Areas or a designated wilderness area. Each individual polygon of isolated land has no history of harvest activity and does not contain forest roads. They are stand-alone polygons of varying acreages all less than or equal to 4,999 acres within the project planning area (Table H1-B). The process used to identify undeveloped lands is described in Appendix H.

There are no forest-wide or management area standards specific to other undeveloped lands in the Umatilla Forest Plan. All lands, including undeveloped lands, are managed consistent with forest-wide standards and guidelines and by designated Forest Plan management area allocations.

### *Scale of Analysis*

The scale of analysis is represented by the Tollgate Fuels Reduction project planning area. Other undeveloped lands have ecological and social values because they do not contain roads and evidence of past timber harvest. These values are used as indicators of comparison to display effects between alternatives. Values and features that often characterize an inventoried Roadless area (36 CRF 294) were specifically avoided as indicators of comparison to reduce confusion as described in the Introduction and Background. That is, other undeveloped lands are not Inventoried Roadless Areas or potential wilderness areas and therefore are described using different indicators of comparison.

## *Measures and Indicators of comparison*

Intrinsic physical and biological resources (soils, water, wildlife, recreation, fisheries, etc.)

- Intrinsic social values (apparent naturalness, solitude, remoteness)
- Change in acres of other undeveloped lands

The descriptions of environmental effects to the 'intrinsic physical and social values' disclosed in the section below for other undeveloped lands also applies to the acres in Hells Canyon Preservation Council (HCPC) map with their identified polygon in relation to other undeveloped lands.

## *Affected Environment*

Table 3-51 displays the acres of other undeveloped lands within the Tollgate Fuels Reduction project planning area along with references to maps in Appendix H for a visual representation. In the 46,464 acre Tollgate Fuels Reduction project planning area, approximately 2,584 acres (about 6 percent of the project planning area) have been identified as isolated polygons of other undeveloped lands that area at least one acre in size. Approximately 13,128 acres (about 28 percent of the project planning area) have been identified as potential wilderness areas (PWA), and the remaining 30,752 acres (about 66 percent) are developed and managed (contain evidence of past harvest and forest roads). Individual polygons of other undeveloped lands less than an acre were eliminated from further study because no special or unique resource values were identified and the description of effects to individual pieces of land less than one acre are better disclosed as part of the other resource effects section in this EIS.

Table 3-52 displays the number, size class, and approximate acres of other undeveloped lands represented. Approximately 90 percent of the polygons are in the 1 to 99-acre size class and represent about 41% of the other undeveloped acres. For perspective, one square mile is about 640 acres, Lookingglass potential wilderness area is about 4,859 acres, the Walla Walla River IRA is 34,416 acres and the North Fork Umatilla Wilderness is about 20,300 acres. The residual shape of each undeveloped polygon is the result of boundaries created by past harvest and road building. The largest polygon of other undeveloped lands is approximately 515 acres or under one square mile. This polygon (number 295 on map H-4) is located in the northeast corner of the project planning area several miles from the nearest treatment unit. It is a long linear area about 4 miles in gross length roughly 1/2 mile in width.

**Table 3-51 — Size Class and Acres of Other Undeveloped Lands in the Project Planning Area**

| Number of Polygons | Size Class | Approximate Acres |
|---|---|---|
| 73 | 1 to 99 acres | 1,064 |
| 6 | 100 to 499 acres | 1,004 |
| 1 | 500 to 999 acres | 515 |
| 0 | 1,000 to 4,999 acres | 0 |
| 0 | 5,000+ acres | 0 |
| **80** | **Total** | **2,584** |

**Table 3-52 — Other Undeveloped Lands by Umatilla Forest Plan Management Areas**

| Management Area | Acres of Other Undeveloped Lands located in each MA | Percent of Other Undeveloped Lands in each MA |
|---|---|---|

| | | |
|---|---|---|
| A3-Viewshed 1 | 960 | 37.1% |
| A5- Roaded Natural | 1 | 0.04% |
| A6-Developed Recreation | 384 | 14.9% |
| A9-Special Interest Area | 32 | 1.2% |
| C1-Dedicated Old Growth | 18 | 0.7% |
| C4-Wildlife Habitat | 488 | 18.9% |
| C5-Riparian (Fish and Wildlife) | 60 | 2.3% |
| E2-Timber and Big Game | 641 | 24.8% |
| **Total** | **2,584** | 100% |

The majority of the 2,584 acres of other undeveloped lands are allocated to Forest Plan management areas A-3 Viewshed 1, C4-Wildlife Habitat, E2-Timber and Big Game (Table 3-52). Any areas with unique ecological values within Tollgate project planning area are currently maintained for those values with Forest Plan standards and guidelines for management area allocations.

Other undeveloped lands include soils, water, fish and wildlife habitat etc. that have not been impacted directly by past harvest and road building. The current condition of soil; water quality; air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; noxious weeds; recreation; and cultural resources within the project planning area, including other undeveloped lands are described elsewhere in this chapter.

No special or unique values in other undeveloped lands have been identified by project resource specialists in their environmental analysis for the implementation of any alternative analyzed in detail.

Human influences have had limited impact to long-term ecological processes within the other undeveloped lands. Disturbance by insects and fire has been and most likely would continue to be the factors with the most potential to impact the area. Opportunities for primitive recreation are limited to hiking, and hunting. Ongoing firewood gathering and removal of danger trees along forest roads that border each polygon changes the vegetation, leaves stumps, and presents a managed appearance within a developed transportation corridor.

Opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance are limited by the size and shape of each polygon. Distance and topographic screening are also factors. The optimum shape and location to retain solitude and a sense of isolation from noise and sights of other humans and their activities would be at the center of a circle. Areas greater than or equal to 5,000 acres or about 8 square miles may have sufficient size to offer a sense of solitude yet this may vary by individual. Long narrow shapes provide less distance from noise at their midpoint. Nearby, non-conforming sights and sounds of roads and timber harvest can be heard and often seen from within the 80 polygons of other undeveloped lands because they are all less than one square mile in size and none are a perfect circle in shape.

The descriptions of the affected environment for other undeveloped lands apply to acres of HCPC polygons that overlap with other undeveloped lands polygons displayed in Appendix I. The existing condition of all remaining 30,751 acres of land within and affected by the Tollgate Fuels Reduction project presents a landscape that has been managed and is generally developed in nature; these lands contain evidence of past harvest and forest roads. Past management actions and current conditions within the 30,751acres reflect the multiple-use intent and decisions made in the Forest Plan (1990 as amended), and reflects consistency with Forest Plan management area allocations.

The descriptions of the affected environment for the 30,751 acres remaining developed acres apply to acres HCPC polygons that do not overlap with IRA/PWAs or other undeveloped lands polygons displayed in Appendix H; map H-5 and Appendix I maps.

# ECONOMIC ACTIVITY

This section incorporates by reference the Tollgate Fuels Reduction Project Economics Report contained in the project analysis file at the Walla Walla Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

## Scope of Analysis

The direct revenue and costs are identified for each alternative measuring the value of wood products to determine the estimated value of each alternative and viability of the Tollgate Fuels Reduction Project with the alternatives identified. While there are other economic values in terms of revenues and costs that would be created from the implementation of this project to wildlife (terrestrial, aquatic), recreation, roads, soil, water and vegetation, the values are intangible and subject to individual personal judgment. Therefore given the inability to determine each person's values for each resource respective of the alternatives those values are unavailable and cannot be used.

This section deals with the economic viability of the Tollgate Fuels Reduction Project area timber sales. Economic viability is dependent on costs and revenues associated with a particular timber sale. Timber sales, non-commercial thinning, fuel activities, and associated resource work can generate employment and stimulate the local economy.

Other environmental factors such as water quality, fish, wildlife, productivity, have value that can be expressed in economic or non-economic terms. However, these other environmental factors do not have financial benefits and cost that are identifiable and quantifiable with relationship to the activities proposed for the Tollgate Fuels Reduction Project. Therefore, an analysis would not show any financial or economic difference in those factors between alternatives. Therefore, economic analysis of those other environmental factors will not be included in this report.

## Current Condition

### *Present Net Value*

The affected area, or economic impact zone, for the Umatilla National Forest consists of Grant, Morrow, Umatilla, Union, Wallowa, and Wheeler counties in Oregon and Asotin, Garfield, Columbia, and Walla Walla counties in Washington. The Tollgate Fuels Reduction Project includes Union and Umatilla counties in Oregon. Economic profiles have been developed for Union and Umatilla counties and are available at the Walla Walla Ranger district. The profiles summarize demographic, employment, and income trends in those counties. Refer to the Umatilla National Forest, land and Resource Management Plan, Final Environmental Impact Statement, Appendix B, for additional detail description of the main social and economic characteristics of the area (USDA 1990).

# CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

# INTRODUCTION

This chapter describes the environmental consequences of implementing each alternative analyzed in detail, as described in Chapter 2.

Effects are shown as being direct (occurring at the same time and place as the triggering action), indirect (separate in time and space from the action that caused them), or cumulative (incremental effect of the project when added to effects from other past, present, and reasonably foreseeable actions). Each resource specialist considered and included activities relevant to the individual resource in the cumulative effects analysis. Direct, indirect, and cumulative effects are described in terms of increases, decreases, intensity, duration, and timing. The discussion of these effects also provides a comparison of the trade-offs associated with each alternative. The scale of analysis may be different for each resource. This chapter ends with a discussion of compliance with environmental laws, and executive orders.

The environmental effects for are disclosed in order identified in Chapter 3 (Affected Environmental).

# PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

The temporal and spatial scale of analysis is variable depending on the resource concern being evaluated, particularly when considering the effects of past, present, and reasonably foreseeable actions. During the interdisciplinary process the team followed guidance presented in CEQ's letter dated June 24, 2005 regarding past actions. Using this guidance the summary of past, present, and reasonably foreseeable actions within and adjacent to Tollgate Fuels Reduction Project planning area, listed in Chapter 3, was developed. These actions were considered where relevant, when addressing the cumulative effects for various resources. The effects are disclosed in this chapter.

# SOILS

Ground-disturbing activities have the potential to create effects to soil resources related to productivity, hydrologic and biological function, and risk of accelerated erosion.

Analysis of the effects concentrates on whether soil disturbance exceeds Forest Plan guidelines for detrimental soil condition, woody organic matter levels, and effects to effective ground cover (as surrogate measure of erosion hazard). Other relevant soils issues are briefly discussed. Analysis of effects of proposed actions relies heavily on professional experience with harvest, fuels activities, thinning and related activities, and comparison with those of the soil characteristics of the units in this area.

## Alternative A - No Action

### *Direct/Indirect Effects*

#### Detrimental Soil Condition (DSC)

This alternative would produce no increase or decrease in detrimental soil disturbance (detrimental soil condition) from project activities. No rehabilitation and native species seeding of existing landings, skid trails, or unauthorized roads would occur.

#### Effective Ground Cover

Effective ground cover would remain on all acres at current rates, with no temporary reductions due to surface disturbance such as yarding of logs or burning of slash. As the prescribed burning of piled logging slash would not occur, the potential for high-severity burn sites from this activity would not occur. There would also be no relief from wildfire risk or the detrimental soil conditions created by a wildfire.

#### Coarse and Fine Woody Debris

Dead wood would remain at current levels. Total dead wood amounts would be within or above the range recommended (Brown et al. 2003) on units that would otherwise be treated in the action alternatives. The positive effects of higher wood amounts for soil productivity over the long-term would be accompanied by increased risk of high-severity fire, which can dramatically reduce downed wood amounts and volatilize nutrients, especially nitrogen (Brown et al. 2003).

### *Cumulative Effects*

There are no cumulative effects to detrimental soil condition (DSC) for this alternative. Additionally, unit 3 will not have a chance to receive any soil rehabilitation and remain below forest S&Gs for DSC. There would be no additional land-disturbing activities. Fuel loadings would continue to build, increasing the risk of high-severity wildfire. Effective ground cover would not change in the short or long-term.

Coarse and fine woody debris levels would not be changed in any area with this alternative.

## Effects Common to All Action Alternatives (B & C)

### *Direct/Indirect Effects*

#### Detrimental Soil Condition (DSC)

Logging activities would create direct effects to soils due to disturbance from harvest and yarding machinery driving over the soil and dragging logs. The effects could be soil compaction, displacement of topsoil, and puddling (rutting in wet soil). Prescribed burning following harvest activities would create some areas of high-severity burn where fuel levels are concentrated and burn for a long time (residence time). An indirect effect would be an elevated erosion risk caused by the exposure of mineral soil due to machine traffic and dragging of logs, primarily with whole-tree tractor and skyline systems. This erosion risk may or may not be realized depending upon weather events.

The intent of the Forest Plan standards and guidelines for detrimental soil impacts is to minimize the extent (area) of detrimental levels of soil disturbance. Specifically, the total area exceeding criteria for detrimental disturbance in any activity area (e.g. harvest unit) should be 20% or less. All of the proposed units currently are within S&Gs with the exception of unit 3.

Different types of disturbances combine together to produce detrimental soil condition (DSC) (USDA FS 2002). Not all soil disturbances affect ecological processes, reduce productivity, or create an erosion hazard. Effects can vary by degree, extent, duration, and distribution depending on the highly variable soil and site characteristics (Jurgensen et al. 1997). Thresholds for compaction, displacement, puddling, and severe burning are described in the Forest Plan (4-80) or Forest Service Manual, Pacific Northwest Region Supplement 2500.98-1. Compaction is typically measured using bulk density changes. In ash soils, which are common in this area, a 20% or greater increase in bulk density is considered to be exceeding detrimental thresholds. Displacement, puddling, and severe burn impacts have separate criteria for detrimental thresholds.

The Forest Soil Scientist[23] was involved with the selection of design criteria with the objective of reducing the extent and degree of potential soil impacts. Contemporary harvest systems proposed for this project are capable of extracting timber with minimal detrimental effects on soil resources. It is common for harvest operations on the Umatilla NF to impact less than 6-12 percent of an activity area with ground-based systems (Farren 2006a and 2006b; Appendix B). Skyline and helicopter systems are typically under 5% (McIver and Starr 2001, Klepac and Reutebuch 2003, and Han 2007). Anticipated effects are based on current research and results monitored on previous harvest and fuel treatment areas on the Umatilla National Forest.

Soil mycorrhizae populations can be affected by soil compaction, rutting or displacement, or slash burning of large piles (Esquilin et al. 2007), affecting roots (Dumroese et al. 2009). Design criteria, contractual controls, and overall limitation of disturbance are intended to minimize potential adverse effects to physical, chemical, and biological soil character and processes. Rehabilitation work before final completion of operations further reduces long-term effects to soil. Response of soils to past harvest activities with much greater disturbance levels than are proposed in this project indicates that ecotypes (soils and vegetation) in the area are resilient to disturbance. Tree growth and soil surface recovery is excellent in plantations in the area, providing indication of recovery of mycorrhizae populations. Positive mycorrhizae repopulation in highly disturbed sites was observed by Harvey and others (1997), indicating mycorrhizae recovery might occur over time.

Tractor-yarding operations typically produce exposed mineral soil on skid trails where tree bundles are dragged to landing areas. The bulk of the soil effect is compaction from the machinery driving over the areas being harvested, with some displacement of surface soils in multiple-pass trails. Avoiding additional excessive detrimental soil effects by use of project design criteria serves to reduce the total area of soils that would otherwise be in a detrimentally-compacted condition (for example, skid trail spacing, use of existing skid trails and landings, operating over project generated slash and subsoiling). Trails average 80-100 feet apart within average-sized units. The area within the trails that is detrimentally disturbed is highly variable (Han 2006, Dumroese et al. 2009). Downed wood and slash that is dropped in the trail and driven over by the skidders and harvesters distributes the weight of the machinery and reduces compaction levels (Han 2006). Slash loads of at least 1 ft. deep can also mitigate equipment caused compaction in some forwarding operations, where both tracks are riding on slash. Displacement of volcanic ash soils can occur when skidding operations can occur during the driest parts of year. Soil conditions are monitored to minimize dust production and loss of fine soil from this process.

Mitigation by subsoiling areas with high degree and extent of compaction (landings and multiple use skid trails) and revegetating with native species (grasses and shrubs) serves to reduce the total area of pre-existing and new detrimental soils within the project area (Craigg 2000 and Archuleta 2008).

Thinning by hand has virtually no adverse impacts to soils. Thinning slash, whether left in place or hand-piled, remains largely within the units. Burning, if prescribed, often occurs from 1 to 3 years later, allowing needles to fall from branches and reduce fire threat to residual trees. Piles in residual stands are normally small enough that fire intensity from pile burning rarely gets hot enough to produce severe impacts on the soil.

Mechanical thinning and/or grapple-piling equipment is proposed in portions of the project, depending upon the alternative selected. Usually, grapple or mastication heads are mounted on small-body excavators with wide tracks. As such, they have relatively low ground-pressure and can work on top of downed logs and existing or harvest-created slash. Still, they can produce additional compaction and

[23] Michele Chapin, acting Forest Soil Scientist during search for new permanent Soil Scientist

some displacement while turning. Operation on downed slash and other woody material and use of existing trails keeps additional compaction and displacement effects low. Monitoring of past grapple-piling and/or mechanized thinning operations on the Umatilla NF indicates detrimental soil impacts in the 0-3% range.

### Effective Ground Cover

Vegetation acts as a barrier and shields the soil from the impact of raindrops. In fact, any material on the surface helps protect the soil from the impacts of raindrops that displace the soil. Effective ground cover includes limbs, tree boles, vegetation or other material protecting soil from erosion. The Umatilla Forest Plan includes standards and guidelines for erosion hazard based on effective ground cover remaining after ground-disturbing activity.

Operational design (systems), and design criteria such as retention of branches and downed wood in skid trails and landing areas has been effective in reducing potential erosion from these types of operations (Han 2006, Dumroese et al. 2009). Keeping erosion control measures (water bars, slash, etc.) working during and after operations is very effective in minimizing erosion hazard. Landings are easily treated for erosion control when use is completed.

No combination of harvest operation system and site treatment or fuels treatment (which also would be in subsequent years) in any one unit would produce levels of bare ground (lack of effective ground cover) above Forest Plan standards and guidelines. Tree planting activity would not measurably decrease effective ground cover.

Broadcast burning affects future stand structure and succession (Grifantini and others 1991). Burning can aid the establishment of planted conifers by reducing competing vegetation. Burning can also favor fire-resistant plants such as grasses and some pioneering plants such as *Ceanothus* species, which add nutrients to the soil (Sexton 1994).

In summary, operational design criteria, choice of operation systems, use of Best Management Practices (BMPs), and contractual control would be such that no unit would exceed effective ground cover standards and guidelines.

### Coarse & Fine Woody Debris

Soil productivity is irreplaceable in human timescales and should be protected (Beschta et al. 1995). Organic matter in the soil surface horizon plays a role in the regulation of water availability, movement and storage, soil structure and soil stability. Alteration of organic resources has a great influence on both biotic and abiotic properties of any given site (Harvey et al. 1987). The interactive roles of wildfire, forest management practices, and organic matter decay are critical for forest productivity in this region.

Extensive research and professional experience has shown that increased fuel loads can result in increased fire intensity and severity. Given the same weather and topographic conditions, areas with higher fuel loads burn hotter, have longer flame lengths, have greater potential to convert to crown fires, are more difficult to contain, pose greater risks to firefighters, kill more vegetation, and damage soils more severely than areas with lower fuel loads. The literature shows that when dead and live tree biomass increase, so does flame length and fireline intensity (Rothermal 1983), and while large woody fuels have little influence on the spread of the initiating fire, they can contribute to development of large fires and high fire intensity and severity (Brown et al. 2003), especially where fuel loads are continuous.

Slash burning has the potential to cause limited nutrient loss to the extent that forest duff and vegetation is consumed. This effect would be greater where post-harvest underburn activities are proposed.

Coarse woody debris (CWD) enhances micro-site conditions and habitat, but is not in itself a great source of nutrients. Nutrients captured in coarse wood are brought to CWD habitat by animals and recycled by decomposers such as fungi. The environmental effects of log removal are primarily related to wildlife habitat alterations.

Compared to No Action, the direct effects of the proposed project could be a reduction of levels of snags (largely for safety reasons) and coarse wood in harvest units. In terms of both short and long-term soil productivity, tree harvest represents some fundamental tradeoffs to the nutrient cycle that organic matter fosters. Tree bole removal would remove a long-term source of organic matter, while reducing the risk of localized severe fire effects by reducing fuel loading where amounts are considered excessive.

Maintenance of adequate levels of soil and soil surface organic matter are key to mycorrhizae populations and healthy soils (Graham et al. 1994). The proposed actions would maintain coarse wood to levels recommended by Brown et al. 2003 and Graham et al. 1994 by ecological site type.

**Cumulative Effects**

Proposed actions are designed with a considered balance between potential site impacts and the feasibility of operations. Previous management activities disturbed soils to varying degrees and extent, with some impacts still exceeding levels considered detrimental as described in the Forest Plan and Regional Guides. Existing soil disturbance is scattered across the proposed activity areas and is concentrated on more level ground that is readily accessed. Soil disturbance is primarily in the form of old skid trails and access roads that were disturbed at the time of their use. This is often referred to as legacy disturbance, and is factored into assessments of cumulative effects when new management actions are proposed.

A certain amount of overlap occurs when logging activity happens on units with existing detrimental soil condition as machinery reuses some trails and landing sites. This tends to reduce the amount of cumulative detrimental soil impacts. Due to the amounts of existing DSC and estimated DSC from the proposal, this analysis provides unit specific recommendations for skid trail overlap to reduce DSC (Appendix C). The overlap of DSC can be best achieved, by reuse of skid trails and landings, where appropriate.

Tree planting activities would not contribute measurably to detrimental soil condition. DSC would be associated with proposed temporary roads. Proposed temporary roads are planned to reduce skidding distance within commercially harvested areas.

With the exception of road surfaces, effective ground cover essentially recovers within 1 to 5 years after revegetation activities and cessation of soil-disturbing activities (Umatilla NF monitoring). Therefore, effects to soil within harvest units are assessed as short-term direct and indirect effects. Coarse and fine woody debris is discussed under Existing Condition and Direct and Indirect Effects.

## Consistency findings with Forest Plan and Other Laws and Regulations

All alternatives would be consistent with Forest Plan standards and guidelines for achieving soil quality maintenance objectives, including detrimental soil condition and effective ground cover. Action alternatives have been designed to achieve project objectives with minimal soil disturbance to reduce added erosion hazard, while balancing operational feasibility considerations. Existing areas of detrimental soil disturbance (DSC) that would be re-used (example: old landings), and additional DSC from the proposed activities, would be mitigated with de-compaction activities as needed and native seeding, thereby ameliorating existing detrimentally disturbed area. This meets guidance included in the Forest Service Manual, Pacific Northwest Region 6 Supplement 2500.98-1.

# HYDROLOGY

## Alternative A

### Direct and Indirect Effects

Riparian Habitat Conservation Area (RHCA) condition would be maintained by natural processes including disturbance factors. There would be no change to the existing condition of the road system. Road improvements and culvert replacements in the analysis area would occur as they were identified in Forest prioritization processes. Few of the analysis area roads have regular maintenance. Problems identified in the existing condition section would remain and through time would worsen to some degree as weather and use degrade road drainage.

Water temperatures would continue at their current near-potential levels. Natural disturbance events like fires and floods could affect temperature regimes over time. Continued lack of road maintenance would be the primary management related sources of accelerated erosion. This disturbance has low risk to downstream water quality due to the upland location of these sources and the low stream power available to transport sediment. Natural disturbance regimes like flood and fire would be the dominant sediment risks for the future.

In subwatersheds with existing recent harvest, vegetative recovery through time would reduce ETA values. Current values of ETA suggest that there is no measurable difference between current conditions and those with no harvest. Additional growth of conifer stands into the future would not measurably change water yield or peak flows.

### Cumulative Effects

## Alternative B

### Direct and Indirect Effects

#### Hydrologic Function

RHCA thinning in 4 units would remove between 0 and 40 % of canopy cover in these units. Shade and erosion potential would be slightly affected (see water quality discussion below). Recruitment of large wood would be affected in some units but these low gradient very low flow streams have no capacity to transport large wood and effects would be confined to channel reaches inside these units. Channel stability would be maintained.

Road maintenance on haul routes would clean culverts, maintain ditches as needed, blade and shape roads, and spot rock weak road beds. These activities would improve road drainage and reduce connectivity of the road system with the drainage network. Reduction in connectivity between the road system and the drainage network would reduce existing and potential effects to timing of runoff.

Two culverts identified in the Affected Environment section (Chapter 3) would be replaced with correctly sized culverts, bedded in native material, and placed on natural stream grades. Timing of replacements would be identified by the fisheries biologist based on reducing adverse potential affects to fishes. These replacements would reduce risk of culvert failure and damage such as scour and bank destabilization, to the streams involved. Two culverts identified above are not on haul routes and would be included on restoration lists for removal as funding became available.

Approximately 0.35 miles of Forest Road (FR) 3718155 would be moved to an upland site outside of the RHCA, this would occur prior to project activities. The existing segment of road would be decommissioned and rehabilitated. Riparian condition would improve and the damage to the spring source would be ended by this project. Construction of 2.6 miles of temporary road would occur in Alternative B. Temporary road locations would be upslope of channel formation on relatively flat ground with no hydrologic connectivity. Cut and fill construction would be negligible. Decompaction, pulling of berms, recontouring, camouflage of entrance, and revegetation would be used to completely decommission these roads at the end of harvest. No effect to watershed function would occur.

### Water temperature

The proposed action would thin trees and remove down wood from RHCAs of four units. The objective in units 19, 38, 66 and 75 is to reduce probability of crown fire initiation and disrupt crown continuity. This entry is designed to protect adjacent infrastructure or private property. Removal would occur on both sides of channels. No material, standing trees or downed wood would be removed from within the buffer widths described in Table 2-3. Thinning would remove between 0 and 40% of canopy cover outside of the buffer areas. These small headwater streams are perennial, except unit 38, where the channel transitions from intermittent to perennial within the unit. All streams with proposed RHCA activities are first order channels and have very low mid to late summer flows—much less than 1 cubic feet per second (cfs)—and are all upstream of fish habitat.

Water temperature may be affected by changes in stream shade (Belt et al. 1992, Brown and Krygier 1970, Brown 1991), stream flow, surface-groundwater interactions, or channel form (Brown 1991, Moore et al. 2005). Retaining streamside unharvested buffers can minimize changes in temperature (Brown and Binkley 1994); however, several studies have found that under some circumstances buffers narrower than those specified by Pacfish may be effective in protecting streams from temperature changes related to harvest activities (Beschta et al. 1997, Brown, 1991, Groom et al. 2011). In fact, buffer width may be less important than streamside canopy density (Brown and Binkley 1994) or other geomorphic or hydrologic factors (Moore et al. 2005).

Many variables are involved in determining water temperature and the effect shade removal can have on water temperature. Different site conditions can lead to different effects, which are seen in the literature. A 2005 review of literature (Moore et al. 2005) discussed water temperature effects as a result of harvest near streams and found that they are primarily controlled by changes in the amount of insolation but also depend on stream hydrology and channel morphology. Increased water temperatures were observed both with unthinned and with partial retention buffers. Two studies cited below discuss the effect of harvest on small headwater stream temperatures and the downstream temperature effect to fish bearing reaches. These studies were selected for discussion because they focus on areas with similar characteristics to the proposed activities and address pertinent questions; very small first order headwater streams, large groundwater influence, and evaluation of water temperature effects on downstream larger streams.

A 1991 study of water temperature effects of riparian harvest which left no buffers on small perennial headwater streams, which were tributary to larger fish bearing streams found very minimal influence on downstream water temperature. This was attributed primarily to the small relative volume of flow compared to downstream and the limited ability to store and transmit heat of these small headwater tributaries. Localized ground water influence was also identified as a contributor to stable stream temperatures. The study found that water temperature in small streams was responsive to localized conditions and quickly came into equilibrium with downstream conditions. Higher than expected shade levels were found in logged reaches, such as contributions from logging debris and understory brush in these western Washington streams (Caldwell et al. 1991).

More recently, the water temperature effect of headwater riparian harvest was evaluated in a northern Idaho study. Two treatment types were evaluated; clearcut and partial cut (thinning) on 50% of the drainage. One clearcut site showed an increase in peak water temperature in the stream reach of the clearcut, the downstream effect was slight. Temperature effects in the partial cut watershed ranged from very slight to no change. Long term monitoring sites, which were located at the base of each treated catchment to assess cumulative downstream temperature effects, indicated a slight cooling trend and no post treatment increase in peak stream temperature. Natural variation or increased water yield post-harvest could account for this result. The study did not detect change in the extent or timing of summer maximum water temperatures. Annual variation in precipitation, snow pack, and summer air temperatures, as well as ground water influence, and increased base flow contributed to these results (Gravelle et al. 2007).

The streams in units 38, 66, and 75 are headwater tributaries to Lookingglass Creek, above the spring complex that controls water volume and temperature for much of the stream and essentially the entire summer time bull trout habitat. Water temperature data (Table 3-4 and Table 3-5) and estimates of flow volume above and below the springs are indicators of the influence of the springs on Lookingglass Creek. Summer base flows increase about 10 times from above the springs to downstream of the springs (personal communication Dave Crabtree) and there is an 8˚F decline in temperature. Canopy cover reductions of approximately 40% are proposed in these units. Groundwater dominates the streams in units 38 and 66, which are formed by local springs and seeps, buffering water temperature from proposed reductions in shade. In these units, measurable increases in water temperature leaving these units would not be expected because water temperature is controlled by groundwater, rather than shade. In Unit 75 perennial wetlands are subsurface before or soon after leaving the unit. The north-west side of the RHCA of a perennial tributary (east boundary of Unit 75) would be thinned. The slope breaks into this stream is about `100' from the channel and lined with seeps. The unit boundary would follow the edge of tractor ground. This would leave an untreated buffer width of about 100 feet or more. The orientation of the creek limits the importance of the shade from the treated portion of the RHCA and the width of the untreated inner portion of the RHCA would protect the shade that reaches the creek (FEMAT 1993). Thus, there would be no measurable increase in water temperature in the tributary from thinning the outer portion of the RHCA. The spring complex described above is downstream of the influence of these activities and provides assurance that no effect to water temperature would occur in summer time bull trout habitat.

The streams in unit 19 are headwater tributaries to the North Fork Umatilla River. The small streams in unit 19 develop from local springs and are ground water dominated. No measurable reduction of canopy cover would occur. Alder provides the large majority of canopy over portions of the streams and very few conifers would be removed. No effect to water temperature downstream of the unit would be expected because no measureable shade would be removed and water temperature is controlled by local groundwater influence.

No measureable affect to water temperature would be expected in the tributaries within or adjacent to treatment units 19, 38, and 66 because these streams originate from local springs and seeps and water temperature is controlled by ground water. Since shade related to canopy cover reductions does not control water temperature in these units, shade analysis and modeling was not used to evaluate effects. There would be no effect to water temperature in unit 75 from the proposed thinning because the width (ranges from 50 to 100 feet) of the untreated buffer and stream orientation adjacent to Unit 75 would protect stream shade. These small tributaries have very limited ability to transmit heat energy downstream. The combination of local ground water influence, limited removal of streamside shade, and low volume of flow would protect downstream water temperature from any effects of thinning in the

RHCAs of these units. Ongoing water temperature monitoring would be continued and used to evaluate the effects of the RHCA treatment on water temperature.

No other vegetation activities; proposed harvest activities or activity fuels activities would occur inside of interim Pacfish RHCAs. Proposed project activities, including timber harvest, slash busting/mastication, prescribed fire, and pre-commercial thinning, would not occur inside of interim Pacfish RHCAs of fish–bearing streams. RHCA widths range from 1-2 tree heights depending on flow regime and the presence/absence of fish (Umatilla National Forest 1990). Shade is controlled by about 1 tree height (FEMAT 1993). There would be no effect to water temperature from these activities.

Danger trees would be felled along all haul routes used in the proposed timber sales. They would be left on the ground inside RHCAs and commercially removed elsewhere. Most stream crossings on haul routes are ephemeral or intermittent with no or very low summer flows. Danger trees felled on haul routes within RHCAs of perennial streams would have negligible effect on shade density for affected streams.

### Sediment

Several studies have found that under some conditions buffers much narrower than those specified by Pacfish may be effective in protecting streams from sedimentation related to harvest activities (Lakel et al. 2010; Rashin et al. 2006), provided that overland flow is not channelized (Belt et al. 1992; Belt and O/Laughlin 1994). Rashin et al. (2006) found buffer widths of 10 meters (approximately 33 feet) were effective in preventing 95% of harvest related sediment from reaching stream channels. With one exception in Unit 66 (discussed below), the low amount of ground disturbance in units 19 and 75, along with the retention of a no-activity buffer within 50 feet or more of the stream channel, would provide sufficient sediment filtering capability to prevent all but a small amount of sediment from entering stream channels.

Although mechanized equipment would be used inside RHCAs in the thinning units discussed above, ground disturbance would be minimal. Systematic implementation monitoring of design criteria and Best Management Practices (BMP) was conducted on the Pomeroy and Walla Walla Ranger Districts during the 2001 field season. Twenty-four forwarder trails in 10 units of the Abla and Cliffhanger Timber Sales were evaluated for spacing, gradient, and percent bare soil. An average of 1% mineral soil exposure was measured. Grapple skidder and harvester/forwarder trails were monitored in 26 skid trails in 9 units of the Lick Timber Sale and averaged 4 % bare soil on trails. Monitoring found effective trail drainage in place greater than 90% of the time. Standards for trail spacing and gradient were met (Umatilla National Forest, 2001-2002) . These results likely continue to be valid, as the harvest equipment, operator skill, and terrain are essentially identical to that which existed at the time of initial BMP monitoring.

Forwarder logging systems would be used in units 19, 66, and 75. These systems operate on a slash bed. In unit 66 forwarder trails would converge on FR 3700040 which curves in this area. Two culverts allow the road to cross perennial channels. The converging path of the trails and the corners that would be turned as forwarders left the unit onto the road would expose and disturb soils at the edge of the road and on the road bed very close to the culverts and to the channels themselves. It is likely that at least some sediment in these locations would enter the nearby streams. These channels have very low flows and so a limited ability to transport sediment. Substantial downstream roughness elements; down wood and riparian vegetation are expected to trap and filter a portion of the sediment which did enter the channel. No measurable sediment or turbidity would be expected below the unit boundary. Minimal ground disturbance in units 19 and 75, along with no activities within 50 feet or more of the stream channel, would provide some sediment filtering capability. As with unit 66, these channels have very limited ability to transport sediment, and contain sufficient roughness elements to trap and filter any sediment which did enter streams.

Tractor systems would be used in unit 38. Standard design criteria for trail spacing and location and erosion control would control disturbance in these units. The channel would have a no-activity buffer between 50 and 100 feet wide on each side of the channel. The stream begins as a wide, wet swale and progresses to a small perennial stream before leaving the unit. It is very low flow, with a small drainage area and as with other units has a very limited ability to transport sediment and substantial roughness elements to trap and filter any sediment which did enter.

With the exception of the RHCA activities described above, design criteria for these activities would include no-harvest RHCAs of Pacfish /Forest Plan interim widths. These design criteria would prevent damage that could contribute to erosion and sedimentation into channels and streams (Belt et al., 1992). Slope gradients would not exceed 35% for these ground based units. Conventional logging systems with tops attached to the last log would have the potential for soil disturbance. Average trail spacing would be 100 feet, which helps to reduce the overall quantity of disturbance. Harvester-forwarders are low disturbance systems with average trail spacing about 50 feet apart and operating over a slash bed. Low psi equipment and the slash matt on trails reduce compaction compared to more conventional systems. Infiltration and mulching with logging slash and/or water bars would prevent surface erosion. Surrounding undisturbed vegetation and RHCA protection would prevent transport of any eroded sediment into surface waters. Systematic monitoring of exposed soil in harvester and skidder trails was conducted in 2001.

No fuels treatment would occur in RHCAs. No ignition would occur in RHCAs during fuels activities though fire would be allowed to back into them where they are adjacent to pile burning. There would be very little effect to existing down material and vegetation density in near channel positions. The potential for sediment to reach channels from these activities is negligible.

Danger tree would be felled but not removed from RHCAs. Sediment production would be negligible from this activity.

Road maintenance would occur on 61 miles of system roads used by timber sales and would include blading, ditch relief culvert cleanout, and ditch cleanout as needed. Culvert cleanout would result in immediate reductions in the risk of culvert failure and resulting negative impacts on water quality.

Necessary ditch cleanout would have the potential for short (less than one runoff season), localized sediment production, which would be fully or partially mitigated by undertaking measures described below. On the other hand, both immediately and over the long term, improvements in ditch function would reduce risks of ditch failure and resulting negative impacts to water quality from the road system. Closed roads would be left in a self-maintaining condition. In a study of sediment production from forest roads, newly cleaned ditches were found to have a sediment yield substantially more than blading of the road surface or traffic use (Luce and Black 2001). This is likely due to the disruption of armored or vegetated surfaces, leading to a larger supply of fine, erodible sediment in a feature that carries water during storms. Ditch clean out would be used only when ditch function was compromised and would minimize disturbance of existing vegetation and natural armoring, practices which are common on the Umatilla National Forest. Detrimental effects from ditch cleanout would be short term, less than one year.

Erosion and sedimentation effects of log haul on forest roads have been the subject of numerous studies. Log haul has been demonstrated to increase sedimentation from hydrologically connected roads during precipitation events, with the effect decreasing as traffic is reduced or ends (Reid 1984). Dry season use of roads or restricting logging traffic during surface runoff from roads can reduce this effect by interrupting or reducing the road-stream connectivity. Road use restrictions and minimized ditch cleanout would reduce sediment production from road maintenance and use to the extent possible.

Two perennial culverts would be replaced during summer low flows with correctly sized culverts, bedded in native material, and place on natural stream grades. The streams involved are very low flow headwater streams. Removal of the existing culverts and bedding new culverts would create short term (not longer than 1 run-off season) sediment production, transport, and deposition at this site. Short term downstream effects would be expected to be small since these small tributaries would not carry sediment far. First flush of sediments in fall rains or spring runoff would carry this sediment downstream. It is unlikely to be measurable downstream in fish habitat against the sediment loads of first flush flows and effects would not last for longer than one runoff season. These replacements would reduce ongoing erosion and risk to these streams of culvert failure and damage such as road fill failure, channel scour, and bank destabilization. Culvert replacements would have short term local effects and longer term, one runoff season, increased sedimentation.

Approximately 0.35 miles of Forest Road 3718155 would be moved upslope to a site outside of the RHCA, this would occur prior to project activities. The existing segment of road would be decommissioned and rehabilitated. Realignment would reduce and eventually end ongoing sedimentation which is currently occurring from the RHCA segment of the road. Decommissioning by decompaction, removal of some small fill slopes, and closing to entry could cause short term minor sediment effects to the adjacent spring, but would allow recovery of riparian vegetation overtime. By creating another route and effectively closing this road segment ongoing disturbance from unauthorized use and blading would be prevented.

Construction of 2.6 miles of temporary road would occur in this alternative. Road locations would be upslope of channel formation on relatively flat ground with no hydrologic connectivity. No sediment from these temporary roads would reach surface waters.

Two existing in-channel ponds would be used as water sources for road work in this proposed project. Deposited sediments would be removed to regain capacity. Short term, not longer than one day, turbidity could occur as ponds refilled and began outflow.

In summary project design criteria and Best Management Practices would prevent soil exposure near channels for most activities proposed in Alternative B. Road maintenance and use, has the potential to cause short term sediment effects from ditch clean out and road use during wet conditions. Thinning stands in RHCAs has potential to expose soils near surface waters. Log removal in RHCA unit 66 would likely lead to some sedimentation as forwarder trails converged on FR 3700040 and cross 2 culverts. The combined effect of very low volume of flow, many in-channel roughness elements, and design criteria that protect channel integrity and minimize soil disturbance would protect water quality and downstream habitat. No measurable effect to water quality would be expected from these activities. Replacement of 2 culverts on perennial channels would lead to short-term (<1 run-off season) sediment production, transport, and deposition adjacent to the culvert replacement locations. Short term sediment effects would occur in these areas but would be unlikely to be transmitted downstream to fish habitat due to low stream power. Long term effects, one runoff season would not be measurable against background sediment loads of high flows. Pond cleanout would have localized short term (less than one day) effects to turbidity.

There would be culvert and ditch work, and other maintenance on roads inside the RHCA of some small headwater tributary streams, but not near to fish-bearing reaches of any project area streams. In one case where an existing closed road (#3718-155) passes through a very wet area, and in fact cuts right through a headwater spring (harvest units 83& 84), that portion of the road would be decommissioned, and a new section of road constructed to avoid that wet area and spring before using the road for harvest activities.

### Water Yield and Peak Flows

Effects of past harvest and road building and proposed harvest on water yield and peak flows were analyzed and assessed using with the Equivalent Treatment Acre (ETA) Model, described in the Affected Environment section in Chapter 3. Table 4-1 displays the results of the analysis. Harvest prescriptions have varying ETA coefficients depending on the post-harvest residual stand and activity fuel treatment. ETA percentages increase in the 4 subwatersheds of the Tollgate Fuels Reduction Planning Area. The increases are below levels at which effects have been seen to water yield, peakflows, or timing of peakflows, as discussed in the Affected Environment. The proposed thinning would have no measurable effect to hydrologic functions; capture, storage, and release of water.

**Table 4-1 — Equivalent Treatment Acre Percent in 2011**

| SWS * | | Alt A | Alt B | Alt C |
|---|---|---|---|---|
| | **LOOKINGGLASS CREEK WATERSHED** | | | |
| 170601041001 | **Upper Lookingglass Creek** | **2.0%** | **4.9%** | **4.6%** |
| | **UPPER WALLA WALLA RIVER WATERSHED** | | | |
| 170701020102 | **Middle South Fork Walla Walla River*** | **10.5%** | **13.3%** | **13.1%** |
| | **UPPER UMATILLA RIVER WATERSHED** | | | |
| 170701030104 | **North Fork Umatilla River** | **1.3%** | **4.2%** | **4.0%** |
| 170701030106 | **Bear Creek** | **0.5%** | **2.0%** | **2.0%** |

* data limitations prevent modeling all subwatersheds within the 3 watersheds entered by the project. All SWS including those not modeled have ETA percentages substantially lower than 15%.

** Includes estimated conifer mortality caused by the 2005 Burnt Canyon Fire in the Middle South Fork Walla Walla SWS.

Potential for effects of the Tollgate Fuels Reduction Project Alternatives B and C to stream flow volume and timing were evaluated by the District hydrologist, using the ETA/ECA model (Table 4-2 below, Ager and Clifton, 2005).

**Table 4-2 — Calculated Equivalent Treatment Areas for Tollgate Fuels Project Alternatives**

| **Subwatershed** | Alternative | | |
|---|---|---|---|
| | **A** | **B** | **C** |
| 170601041001 (Upper Lookingglass Creek) | 2.0% | 4.9% | 4.6% |
| 170701020102 (Middle South Fork Walla Walla River) | 10.5% | 13.3% | 13.1% |
| 170701030104 (North Fork Umatilla River) | 1.3% | 4.2% | 4.0% |

| | | | |
|---|---|---|---|
| 170701030106 (Bear Creek) | 0.5% | 2.0% | 2.0% |

Recent reviews of literature demonstrate that the relationship between created openings and water yield or peak or base flows is highly variable (Stednick 1995, and Scherer 2001). Generally effects are not observed below 15-20 percent equivalent clearcut or equivalent treatment acres (ECA or ETA) and in a local study; effects were not seen below 50 percent ECA (Helvey 1995). Grant et al. (2008) suggests that increased peak flows could occur at ≥ 20% "ECA."

## Cumulative Effects

The water temperature and sediment regimes of analysis area streams has likely been affected by past actions; logging history, road building, grazing, and development and management of special use and administrative sites, and road maintenance. Water temperature, as it is affected by shade has been protected by the Forest Plan (Pacfish ) since the mid-1990s and shade producing vegetation is recovering at natural rates.

Certain ongoing actions including road maintenance, Swamp Creek road decommissioning, and administrative and special use site maintenance likely contribute to ongoing elevated sediment regimes. Substrate condition of the analysis areas streams suggests that the sediment load is not adversely affecting fish habitat (Fisheries Biologist Report). Thinning inside RHCAs, especially Unit 66, replacement of culverts on 3 perennial streams, and ditch cleaning would have short term effects to sedimentation near the sites of disturbance but would be unlikely to be transmitted downstream to fish habitat due to low stream power. Long term effects, one runoff season would not be measurable against background sediment loads of high flows.

Harvest history in the analysis area is incorporated into the analysis with the ETA analysis, above, with the conclusion that there would be no effect to water yield or peak flows from the proposed project.

The project area boundary for High Buck, a future vegetation management project, includes a portion of the North Fork Umatilla subwatershed. Analysis of the future project would include ETA effects of the Tollgate Fuels Reduction Project. In the unlikely event that cumulative ETA between Tollgate and proposed High Buck activities reached what are considered thresholds of potential effects, a more in-depth analysis would be done. High Buck would be modified as needed to avoid damaging peak flow effects to channels or changes in water yield.

Road and culvert maintenance would continue as in the past. This may loosen some soil and make it more available for transport to streams, but overall this would reduce the sediment yield from roads. Any sediment contribution from roads and culvert maintenance would be insignificant as compared to not maintaining the roads. The contribution of road and culvert maintenance to cumulative effects would therefore be to maintain channel substrate and water quality at a higher level than would exist without this activity.

RHCA condition has been affected by past logging and roads as discussed in the Affected Environment section of this report, above. Since the mid-1990s implementation of Pacfish has protected RHCAs from logging and allowed recovery where needed. About 8% of streams in the analysis area have had harvest inside their RHCAs and this would have been concentrated in the headwater areas of the plateaus where these activities occurred. RHCA thinning proposed in this project would only minimally affect RHCAs and would not prevent the maintenance or attainment of Riparian Management Objectives. Past road building and decommissioning is incorporated into the analysis with road density and proximity of roads to channels described in the Affected Environment (Table 3-3). No permanent road building would occur in this proposed project and there would be no net change in miles of road or road density. Hydrologic function would be maintained with a very slight improvement attributed to maintenance of road drainage features, especially replacement of 3 damaged culverts. Proximity of roads to channels would very slightly decrease with the realignment of 0.35 mile of FR 3718155 to a location outside of the RHCA.

There is one livestock grazing allotment in the analysis area, the North end Transitory Sheep and Goat (North End S&G) allotment. This allotment covers approximately 122,310 acres and includes six grazing units (~pastures) used by four bands of sheep each year from June 1st through October 9th. A band of sheep consists of 1000 ewes with lambs. With four bands of sheep and six units, two units can be either rested or deferred each year. This allotment has not been stocked since 2001 by the choice of the permittee. The Annual Operating Plan sets the direction for grazing, the on and off dates and the amount of time spent in each unit.

## Alternative C

### *Direct, Indirect and Cumulative Effects*

Tollgate Fuels Reduction project alternative C differs from Alternative B primarily by reduction in the amount of some types of treatments. There would be less commercial thinning, less non-commercial thinning, fewer acres of all types of logging operations, fewer acres of slash treatment, fewer acres where trees larger than 28 inches DBH would be removed, Less treatment in Pacfish RHCA's, and no entry at all into the Lookingglass Inventoried Roadless Area (IRA).

Under Alternative C, only Unit 19 would have RHCA entry. Affects to riparian condition and function would be less than those discussed in Alternative B and would be negligible for the headwater streams in Unit 19. Road maintenance and use, culvert replacement, road realignment and decommissioning, and temporary road construction would be the same as in Alternative B and the effects would be the same as those discussed for Alternative B. The small streams in the unit develop from local springs and are ground water dominated. Few conifers would be removed from the RHCA and no measureable reduction in canopy cover would occur. Alder provides hardwood canopy over portions of the streams. No effect to water temperature downstream of the unit would be expected because of the local groundwater influence and the limited entry into the RHCA. As in Alternative B, all other activities would protect RHCAs and there would be no or negligible effect to water temperature.

Fewer acres would be thinned and have fuels activities in this alternative than in Alternative B. Only Unit 19 would have RHCA thinning. Risks associated with RHCA thinning in Unit 66 would not occur because the unit would be dropped. Road maintenance and use, culvert replacement, road realignment and decommissioning, and temporary road construction would be the same as in Alternative B.

Effects would be similar to those described in Alternative B. Project design criteria and Best Management Practices during implementation would prevent soil exposure near channels for most activities proposed in Alternative C. Road maintenance and use, has the potential to cause short term sediment effects from ditch clean out and road use during wet conditions. Replacement of 3 culverts on perennial channels would lead to short-term (<1-3 years), local sediment production, transport, and deposition adjacent to the culvert replacement locations. Short term sediment effects would occur in these areas but would be unlikely to be transmitted downstream to fish habitat due to low stream power. Longer term effects, one runoff season, would not be measurable against background sediment loads of high flows.

Fewer acres of thinning would occur in Alternative C than in Alternative B. Table 4-1 displays the results of ETA analysis for the alternatives considered in detail. ETA values are somewhat lower for Alternative

C in three of four project subwatersheds. Both action alternatives have very low values and the effect to water yield and peakflows from these activities would be negligible.

Fewer acres of thinning and fuels management are proposed in Alternative C than in Alternative B. RHCA thinning has been dropped in all but Unit 19. Road maintenance and use, culvert replacement, road realignment and decommissioning, and temporary road construction would be the same as in Alternative B. Cumulative effects would be similar to, but somewhat less than in Alternative B.

## *Consistency Findings with respect to applicable laws and regulations (Alternatives B and C)*

### Clean Water Act

The State of Oregon recognizes the Forest Service as the management agency responsible for meeting the Clean Water Act on NFS lands and recognizes best management practices (BMPs) as the primary mechanism to control nonpoint source pollution on NFS lands. There is further recognition that BMPs are developed by the Forest Service as part of the planning process and includes a commitment by the US Forest Service to meet or exceed standards

The Umatilla National Forest incorporated protection of water quality as an important management goal and explicitly set ground disturbance and shade standards to protect it in the 1990 Land and Resource Management Plan. In the mid-1990s Pacfish amended the plan by adding Standards and Guides and RHCA protections designed for, among other objectives, maintenance and recovery of shade and morphology components (including sediment regime) of water temperature. Managing to these standards has protected ground cover and existing shade and allowed for recovery of those elements at near natural rates for almost 2 decades. Restoration work aimed at reducing sediment sources through road decommissioning has been ongoing, much of it occurring since the floods of 1996 and 1997.

The Umatilla National Forest has a high rate of compliance with BMPs. School Fire Salvage EIS RHCAs were monitored in 2006 (Table 4-3). Buffers on 18 units, 23 percent of identified RHCA influence units, were monitored in July and August 2006. Results are displayed below. Average buffer widths exceeded standards for all stream categories.

**Table 4-3 — Average Buffer Width by Stream Category( School Fire Salvage Sales)**

| | **Average (ft.)** | **Number of Measurements** | Pacfish **Standard** |
|---|---|---|---|
| **Fish Bearing Streams** | 325 | 32 | 300 |
| **Perennial Non Fish Bearing** | 187 | 59 | 150 |
| **Intermittent** | 150 | 87 | 100 |
| **Dissected Ephemeral** | 36 | 34 | No standard BMP = 25' |

RHCA effectiveness was also measured and reported in 2001 as follows: no cases of erosion or sedimentation were observed post-harvest in RHCAs.

RHCA thinning activities would be unlikely to measurably affect water temperature in downstream locations due to the limited ability of the very small headwater tributaries to transmit heat. Water temperature monitoring on Lookingglass Creek and on North Fork Umatilla River would continue.

Identification of BMPs for the proposed projects has occurred and any project which might occur in this planning area would be considered for monitoring in the Umatilla National Forest annual BMP monitoring plan. These activities would not detrimentally affect beneficial uses. Riparian and channel components that protect water quality would be maintained. Other design criteria and BMPs would control disturbance that could lead to erosion and sedimentation. Effects of proposed actions would not adversely or measurably affect water temperature. Short term measurable turbidity effects could occur at the culvert sites during replacement of 2 culverts. Best Management Practices have been incorporated into the project design criteria for the culvert replacement and would be monitored. The proposed project is in compliance with the Clean Water Act.

### Floodplains, Executive Order 11988

Executive Order (EO) 11988 requires the Forest Service to avoid "to the extent possible the long and short term adverse impacts associated with the occupation or modification of floodplains…" The proposed alternatives would avoid all floodplains and affects to floodplains and is consistent with this EO.

### Wetlands, Executive Order 11990

Executive Order (EO) 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands." The proposed alternatives would avoid all wetlands and affects to wetlands and is consistent with this EO.

### Safe Drinking Water Act Compliance

The North Fork of the Umatilla River was legislatively withdrawn from appropriation as a municipal water supply for the City of Pendleton by the state of Oregon in 1941. In 1984 the area was subsequently designated as a wilderness area and the city has since transferred its water intake to a point on the Umatilla River near the City of Pendleton. The City of Pendleton uses membrane filtration for water treatment.

The 1996 amendments to the Safe Drinking Water Act require Federal agencies that manage lands which serve as drinking water sources to protect these source water areas. Source Water Area delineation has been completed and a source water assessment has been conducted for the City of Pendleton. High to moderate risks have been identified. On National Forest Lands in the assessment disturbances such as road building and use, and timber harvest were evaluated as: "Risk reduced to Lower because PCS (potential contaminant sources) in the upper reaches of the watershed represent a very low risk to the City's source water." http://www.deq.state.or.us/wq/dwp/docs/swasummary/pws00613.pdf

The activities proposed in the Tollgate Fuels Reduction Project are nearly 50 river miles upstream of the City of Pendleton. Design criteria and best management practices have been identified to prevent or minimize damage to soils and stream channels. Those and other BMPs identified for this project are discussed above. No effects to the surface water system of Pendleton would occur from proposed actions. Action alternatives in the Tollgate Fuels Reduction Project comply with the Safe Drinking Water Act.

### Umatilla Forest Plan

Implementation of design criteria and best management practices as described above, Umatilla National Forest Road Use Rules, as well as standard Umatilla NF timber sale contract specifications or the corresponding stewardship contract specifications would constitute compliance with the Umatilla National Forest Land and Resource Management Plan for hydrologic and water quality components.

Pacfish (1995) stands as an amendment to the Umatilla National Forest Plan. Pacfish states:

> Prohibit timber harvest, including fuelwood cutting in Riparian Habitat Conservation Areas, except as described below…
>
> Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects on listed anadromous fish can be avoided. For watersheds with listed salmon or designated critical habitat, complete Watershed Analysis prior to salvage cutting in RHCAs.

Alternative B of the Tollgate Fuels project work proposed inside RHCAs of several headwater tributaries is not salvage following a catastrophic event, and so does not qualify as an exception to the general prohibition against cutting inside of RHCA's.

# FISHERIES

## Alternative A: No Change in Management Activities

### *Direct, Indirect, and Cumulative Effects*

Under Alternative A of the Tollgate Fuels Reduction project, the Forest Service would not change management in these watersheds, and therefore would not change direct, indirect, or cumulative effects to fish or their habitat. Alternative A of the Tollgate Fuels Reduction project would tend to maintain the present condition of aquatic species and aquatic habitat in all project area streams and subwatersheds. Alternative A would therefore not reduce the viability of *O. mykiss*, *O. tschawyscha*, *S. confluentis*, or other aquatic species in project area watersheds.

Alternative A is the No-Action alternative. There would be no timber harvest, no prescribed fire, no log haul, and no restoration activities proposed under the no-action alternative. There is therefore no mechanism for direct or indirect effects to ESA listed species of fish or to USFS R6 sensitive fish, or to their habitat (including hydrologic characteristics), and no contribution to cumulative effects to these fish or their environment. Therefore there would be *no effect* to Proposed, Endangered, Threatened or Sensitive Fish species from Alternative A.

For the same reasons there would be no unavoidable adverse environmental effects, and no irreversible or irretrievable commitment of resources.

## Alternative B

### *Direct and Indirect effects*

Direct and indirect effects analyzed for activities included within Alternative B include both effects on individual fishes and their occupied habitat, as well as any unoccupied habitat required for recovery.

Although there would be project activities in RHCAs of some non-fish-bearing streams, there would be no project activities in fish-bearing portions of streams, or even in RHCAs of fish-bearing portions of streams, so there would be *no direct effects* to any aquatic species. Indirect effects, of the actions necessary to implement alternative B, if any, would be through effects to habitat. Effects to specific habitat components are be evaluated individually on the following pages.

### Water quality

Direct and indirect effects of the activities included under Alternative B on water quality measures are discussed earlier in this chapter. The implications of effects on water quality on fisheries resources are discussed below.

#### *Water Temperature*

None of the four units occurring within Pacfish RHCAs are near fish-bearing streams. Since trees that could affect stream water temperatures would not be harvested from fish-bearing streams and harvest in the RHCAs of upstream tributaries would not alter stream temperatures, under the Tollgate Fuels Reduction project, there would be *no effect* to water temperature from harvest treatments or associated activities.

#### *Sediment*

The sediment component of water quality is also a component of channel substrate. Sediment flux affects (and may be affected by) substrate habitat conditions, and so is addressed together with substrate in that section.

#### *Chemicals/contamination*

Potential sources of chemical contamination from the Tollgate Fuels Reduction project include spills of fuel, lubricants or hydraulic fluids from harvest machinery and spills of fire management chemicals (drip torch fuels, wetting agents). Since there would be no prescribed fire inside of RHCA's, there is no mechanism for drip torch fuels or wetting agents to reach streams. Fueling and servicing of all equipment would be performed outside of RHCA's, so spills of these substances would not reach streams. But machinery would be operating inside of RHCA's, of two project subwatersheds and the possibility of an accident (e.g. burst hydraulic hose) although unlikely, cannot be completely eliminated. Therefore, chemical contamination of streams in those two project sub-watersheds is *very unlikely*. Since there are no known sources of chemical contaminants from project implementation activities, there would be *no chemical contamination* of streams the South fork Walla Walla and Bear Creek Subwatersheds.

#### *Habitat Access:*

**Physical barriers:** No project activities would be conducted in any fish-bearing streams, and so not would create physical barriers or in any way change habitat access

#### *Substrate*

As described earlier in this chapter and in Chapter 2, there would also be two culvert replacements in access roads crossing very small, perennial, non-fish-bearing headwater tributaries of project area streams. Culvert replacements in perennial streams would be done during the in-water work window as designated by the Oregon State Department of Fish and Wildlife for that watershed or stream system. Because of the small size of these streams and their distance from fish-bearing waters, it is highly unlikely that detectable amounts of sediment from culvert and road work would reach fish-bearing stream reaches.

Timber haul from Tollgate project units would be hauled over graveled and/or native surface roads mostly on ridge tops or otherwise high in the watershed to Oregon State highway 204, which is paved. No haul over graveled or native surface roads near to fish-bearing streams is expected, so delivery of additional sediment produced by timber haul, to fish bearing streams is very unlikely.

All timber harvest would be outside of Pacfish RHCAs of fish bearing streams. That is to say, it would be 300 feet or farther from fish bearing streams. There would be Four treatment units (#19, 38, 66, 75) with timber harvest inside of Pacfish RHCAs of perennial, non-fish bearing streams. In some of these, timber harvest would be implemented quite close to the stream channel, up to the edge of the inner gorge, which could be as close as 30 feet from the water's edge.

As described earlier in the hydrology section of this chapter, the combined effect of very low volume of flow, many in-channel roughness elements, and design criteria that protect channel integrity and minimize soil disturbance would protect downstream habitat. These activities would not be expected to prevent attainment or retard recovery of the sedimentation Riparian Management Objective (Pacfish 1995).

Based on monitoring results from similar situations in the Northern Umatilla National Forest, the hydrologist for this project has concluded that project design criteria such as mulching exposed soil in RHCA's, together with in-channel roughness elements and distance to fish bearing water, would protect water quality to the extent that there would be no measurable effect to water quality (see water quality discussion earlier in this chapter). And since the riparian unit stream channels are non-fish bearing, with fish-bearing waters 1/3 of a mile or more downstream, detectable effects there would be even less likely. Because some variables, weather in particular, are beyond the control of project managers, and could potentially interact with project activities in unexpected ways, and because of the proximity of project activities to stream channels increases risk in some harvest units; although adverse effects are *very unlikely*, the risk here cannot be completely eliminated.

### Large woody debris

Except for the four riparian harvest units, all timber removal would be from sites outside of Pacfish RHCAs and so there would be no potential for changes in large woody debris frequency in fish bearing streams due to project implementation.

In the four riparian harvest units, there would be some removal of trees that might otherwise have fallen into non-fish-bearing streams. However, since these are all small, non-fish-bearing headwater tributaries, there would be no change in frequency of large woody debris in fish-bearing reaches, and so *no effect* to large woody debris frequency in fish habitat. Effects, if any would be to non-listed amphibians or invertebrates in these small headwater streams and wetlands. The District Wildlife Biologist would evaluate effects to those organisms.

### Pool frequency

No management activities are proposed in the RHCAs of fish bearing streams so there is no mechanism to change the number of pool forming structures there. Removal of trees from the RHCAs of several very small headwater streams (Harvest units 19, 38, 66, 75) could theoretically alter pool frequency there but these are tiny streams which don't need large, tree-sized woody debris to develop adequate channel roughness, and in any case this would not affect the habitat of fish which is farther downstream.

There would be insufficient change in flow or sediment flux to alter pool frequency in any streams in any project subwatersheds (see the sediment and flow sections of this document), so there would be *no effect* to pool frequency.

### Off-channel habitat

Because there would be no project activities in stream channels or within the RHCA of fish-bearing streams, and by the nature of the project other activities are not of a type that would alter off-channel habitat, there would be *no effect* to off-channel habitat.

### Wetted Width/Maximum Depth Ratios

Wetted width/depth ratios can be affected by changes in flow or sediment regimes, or by direct alteration of the channel form by machinery or livestock use. No changes in flow or sediment regime are expected (see the discussions of those parameters in this chapter) and there would be nor direct alteration of channel form with the Tollgate Fuels project, so there would be *no effect* to wetted width/depth ratios.

### Stream Channel conditions

#### *Stream bank condition*

Stream bank conditions can be altered by changes in flow regime, by removal or other alteration of vegetation or through direct alteration by machinery or livestock use of the stream bank. Changes in the flow regime are not expected in this project and there would be no direct alteration of stream banks under the Tollgate Fuels project. Since there would be no project activities in fish-bearing stream reaches or in RHCAs of fish-bearing reaches of streams, there would be *no effect* to stream bank conditions there.

Project work in the four riparian harvest units would be outside of the inner gorge of the streams in or bordering the units, and so there would be *no effect* to stream banks.

#### *Floodplain connectivity*

Floodplain connectivity would be decreased if stream channel entrenchment were increased. There are no mechanisms by which project activities would increase channel entrenchment or otherwise decrease floodplain connectivity, so there would be *no effect* to floodplain connectivity.

#### *Substrate*

Since detectable changes in erosion, sedimentation, or flow are unlikely, (see the respective sections of this document), effects to channel substrate are also *very unlikely*.

### Change in peak or base flows

The harvest and prescribed fire proposed under the Tollgate Fuels project would not raise the %ECA of any subwatershed to a level that would produce detectable changes and so there would be *no effect* to peak or base flow.

### Increase in drainage network

Since there would be only a very small amount of new road constructed, and none of that would cross any stream channels, and would have no other linkage to existing streams, the Tollgate Fuels project would have *no effect* on the drainage network of the project area subwatersheds.

### Road density and location

Temporary roads, totaling 1.7 miles would be constructed in three of the project area subwatersheds (upper Lookingglass, Middle South Fork Walla Walla, North Fork Umatilla) for access to treatment units. The present road density computed for these three subwatersheds together is 2.01 miles/mile$^2$. These access roads would temporarily increase road density over the three subwatersheds to 2.03 miles/mile$^{2,}$ an increase in road density of 0.02 miles/mile$^2$. This amount is actually below the mapping precision of current GIS data for the project area, so the temporary increase in road density is so small as to be effectively unmeasurable. These temporary roads would be entirely outside of Pacfish RHCAs and would be decommissioned and restored to vegetative productivity at the end of the project.

The Umatilla National Forest hydrologist has determined that these "road locations would be upslope of channel formation on relatively flat ground with no hydrologic connectivity." (Peterson 2011). So although upland road density would increase very slightly, there would be *no effects* to fish or other aquatic biota.

#### Riparian Habitat Conservation Areas

Four project treatment units include entry into Riparian Habitat Conservation Areas. Live trees, snags, and down wood would be removed from the RHCA in these units. These units are not adjacent to fish-bearing streams, but treatments would decrease the amount of shade and woody debris above and around some small perennial, non-fish-bearing streams. So technically there would be a detrimental effect to a few hundred feet of RHCA's, but it is *highly unlikely* that effects of these treatments would be detectable downstream in fish-bearing stream reaches.

### *Summary of the implementation effects of the Tollgate Fuels project Alternative B to aquatic habitat for ESA listed and R6 Sensitive fish*

The preceding discussion of the effects of the activities necessary to implement the Tollgate Fuels Reduction project are summarized in Table 4-4. Project activities would produce no effect whatsoever to most aquatic habitat parameters. For some other habitat components or watershed conditions, effects are highly unlikely, and are not expected, but risk cannot be entirely eliminated, so those are designated as not likely to be adversely affected. Overall, no adverse effects to fish or aquatic habitat are likely from implementation activities for Alternative B.

**Table 4-4 — Summary of Potential Effects1 of Alternative B of the Tollgate Fuels Reduction Project by Habitat Parameter and Subwatershed**

| **Parameter** | **Subwatersheds** | | | |
|---|---|---|---|---|
| | Upper Lookingglass (HUC 170601041001) | North Fork Umatilla River (HUC 170701030104) | Middle South Fork Walla Walla River (HUC 170701020102) | Bear Creek (Umatilla River below forks – HUC 170701030106) |
| Direct effects to fish species | NE | NE | NE | NE |
| Indirect effects through effects to habitat | | | | |
| Water temperature | NE | NE | NE | NE |
| Chemical contamination and nutrients | NL | NL | NE | NE |
| Physical barriers | NE | NE | NE | NE |
| Sediment & Substrate | NL | NL | NL | NL |
| Large woody debris | NE | NE | NE | NE |
| Pool Frequency | NE | NE | NE | NE |
| Off channel Habitat | NE | NE | NE | NE |
| Wetted width/Max depth | NE | NE | NE | NE |
| Streambank conditions | NE | NE | NE | NE |
| Floodplain connectivity | NE | NE | NE | NE |

| | | | | |
|---|---|---|---|---|
| Change in peak or base flows | NE | NE | NE | NE |
| Increase in drainage network | NE | NE | NE | NE |
| Road density and location | NE | NE | NE | NE |
| RHCAsof fish bearing streams | NL | NL | NL | NL |
| | | | | |
| [1]NE= no effect, no potential for effect, NL = Adverse effect unlikely, but possibility of an effect cannot be entirely discounted or eliminate, LA = likely to affect. | | | | |

The preceding discussion deals with the immediate effects of the actions necessary to implement the Tollgate Fuels project. There is also a larger question to be addressed. The larger question is: If the Tollgate project is successful in changing the fire regime (frequency, size, and/or intensity) in this area, what effect if any, would that change have on aquatic organisms or their habitat?

Large, high intensity fires, especially if they burn intensively in riparian areas, can produce extensive and severe effects to aquatic habitat and threaten fish populations that exist in remnant or compromised habitats. Effects can include loss of stream shade, hillslope and channel erosion, sediment deposition and channel evulsion, changes in water chemistry, and increases in water temperatures (Rhoades et al., 2011, Rieman 1997; Sestrich 2005). Fish populations in severely affected streams can be completely extirpated. In this context, mitigation of fire severity and its hydrologic effects could benefit fish populations and support their persistence (Rieman et al. 2010).

On the other hand wildfire can be viewed as a natural process that can contribute nutrients, wood, and coarse substrates and thus help maintain or re-create productive habitats, whereas fuel management can be a disruptive process that further degrades habitat. Dunham et al. (2007) and Neville (2009) both concluded that wildfire alone was not so much a threat as are human influences that degrade aquatic habit, making the aquatic organisms less resilient in the face of large intense fires.

Effects of wildfire may be initially severe, but are usually of a shorter term (acute) while effects of human management may initially be less severe, but much more persistent (chronic). A primary purpose of the Tollgate Fuels Reduction project is to change the disturbance regime at this location from the natural cycle of stand-replacing fires at long intervals (200 – 300 years) to a condition of smaller fires and reduced fire intensity, where fires that do happen would be small and manageable, at least in the area around the wildland-urban interface. Frequency of fires would probably not be much affected by implementation of the Tollgate project, as factors controlling fire starts (primarily lightning in this area) are mostly beyond the control of the Forest Service. Size and intensity of fires would be changed though, with post-project fires expected to be smaller, less intense (lower burn severity) and probably would burn in more of a mosiac pattern, with some areas burned severely and others burned lightly or not at all.

So clearly, the disturbance regime would be altered by this project. Effects could be expected to carry over downstream in fish-bearing waters, where the natural cycle would have included intense episodes of habitat alteration following a high severity wildfire. Debris flows, sedimentation of some parts of the stream, scouring of other parts, introduction of more large woody debris, channel evulsion, pool filling and new pool creation would have all been part of the natural cycle here.

Prior to European settlement in this area, it is likely that fish populations in some project area streams would have been extirpated as part of that natural cycle, but would have been re-established by migrants from neighboring streams. This highlights the critical status of connectivity among aquatic habitat patches. During the Tower Fire and subsequent landslides and hydrologic events in North Fork John Day watershed in Northeastern Oregon’s Blue Mountains, fish were eradicated from several streams tributary to the North John Day River. Within four years, though native fish species had recovered to pre-fire levels (Howell 2006).

Sestrich et al. (2011) concluded that connected native fish populations will usually be resilient to seemingly catastrophic high-severity wildfire disturbance and associated debris flows and are capable of rapid recovery even when in sympatry with nonnative fishes. The streams in these studies had nearby, ready sources of migrants to repopulate the defaunated reaches though. In the case of the Tollgate project area streams, connectivity varies considerably between the watersheds involved.

In the case of the very vulnerable North Fork Umatilla River bull trout population, connectivity to other populations is nearly non-existent, primarily because of downstream (below the National Forest) conditions. A large, high-intensity fire in the North Fork Umatilla watershed could completely eradicate that bull trout population with little hope of re-establishment for a very long time. Because of the weakness of this population and lack of connectivity to potential re-founding bull trout populations, reducing the size and intensity of wildfire in the watershed would be *protective* of the species persistence here.

The bull trout populations in the South Fork of the Walla Walla River and in Lookingglass Creek, both have connections to other, viable bull trout populations, the Wenaha River and other Grande Ronde River tributaries upstream in the case of Lookingglass Creek, and Mill Creek and the Touchet River system in the case of the South Fork of the Walla Walla River. Immigrants from neighboring watersheds would probably re-establish the bull trout populations in these watersheds fairly quickly after wildfire and related disruptions. Therefore the Tollgate fuels project would provide *no overall advantage* to bull trout in these two watersheds.

Salmon and steelhead in all of these watersheds would be less at risk than bull trout because of their anadromous nature, which means that only a single year cohort would be completely eliminated, with returning adult fish available to repopulate the habitat almost immediately, so the Tollgate fuels project would *not provide any important protection* for these species in any of the project watersheds.

In conclusion, to the extent that the Tollgate Fuels Reduction project is successful in altering the disturbance regime of the area, it may offer additional protection to the very vulnerable bull trout population in the North Fork of the Umatilla River, but would not benefit bull trout in any of the other watersheds, and would not benefit steelhead or Chinook salmon in any of the project area watersheds. Effects over the term of the natural fire cycle in the upper reaches of streams in these watersheds (200-300 years) are necessarily speculative but adverse effects during foreseeable management periods are *unlikely*.

### Cumulative effects

Timber harvest activities of the Lower Sheep and Loon timber sales have concluded in the Lookingglass Creek Watershed. Neither of those included harvest inside of the RHCAsof streams in the Upper Lookingglass, North Fork Umatilla, or Bear Creek subwatersheds.

The Lower Sheep project had no harvest activities inside the RHCAs of the Tollgate Fuels Reduction project subwatersheds The only Lower Sheep Project activity that would have had potential to directly contribute to adverse cumulative effects with the Tollgate Fuels Reduction project would have been log haul over Forest Road 63 along Lookingglass and Little Lookingglass Creeks. All timber harvest and log haul has been completed for that project, so the Lower Sheep timber sale would produce no contribution to cumulative effects with the Tollgate Fuels Reduction project. As discussed in the hydrology section above, the cumulative effects on equivalent clearcut acreages for the project subwatersheds indicate that there would be no detectable effect to water yield or stream flow.

Likewise for the Loon project, there was no harvest inside RHCAs of streams in Tollgate project area subwatersheds. Timber harvest and log haul are finished, so there is no opportunity for contribution to effects cumulative with those activities, and calculations of clearcut acreages included in the hydrology section in this chapter show that there would be no detectable effect to water yield or flow.

Loon project activity fuels treatments could continue for one or two more years, depending on weather and allowing two additional years of recovery of soil surface protection, there could be a maximum of four years (through 2016) of contribution to cumulative effects by the Loon project, which could produce up to three years of overlap if the Tollgate project were to begin implementation in 2013. However, as discussed elsewhere in this document, adverse effects to fish or their habitat are not expected and there would most likely be no detectable effects cumulative with effects of the tollgate project.

In 1998, the National Marine Fisheries Service (now NOAA Fisheries) concurred with findings by the Umatilla National Forest that the North End S&G allotment was Not Likely to Adversely Affect Snake River steelhead in the Lookingglass Creek and Middle Grande Ronde River Watersheds (letter from William Stelle, Jr., to Jeff Blackwood, dated August 28, 1998).

The U.S. Fish and Wildlife Service likewise concurred that this livestock allotment were Not Likely to Adversely Affect bull trout in the Lookingglass watershed (letter from Russel D. Peterson to Jeff Blackwood, dated December 21, 1998)

Grazing activities in these watersheds, as they are presently conducted would not contribute to effects cumulative with the Tollgate Fuels Reduction project.

### Development (other than roads)

#### *Langdon Lake*

Langdon Lake forms the headwaters of Lookingglass Creek. Most of the shoreline of Langdon Lake is privately owned, and is thickly built up with the owners' cabins. Until recently wastewaters from these cabins went into septic systems. There is now a wastewater treatment facility for these cabins. It seems likely that leaching from the septic systems could have made the lake and this part of Lookingglass Creek more eutrophic than natural. The new wastewater treatment facility is expected to reduce or eliminate that effect. In any case Tollgate project activities would not contribute any type of chemical contamination to any of the streams in project area subwatersheds, so there would be no effect cumulative with effects, if any, from the Langdon Lake cabin owners waste waters.

Exotic brook trout have been stocked in Langdon Lake and pose a threat to ESA Threatened bull trout in Lookingglass Creek. Any activity that facilitated the spread of brook trout into Lookingglass Creek would increase stress on the bull trout population there. None of the Tollgate project activities would support the spread of brook trout, and so would make no contribution to this component of stress on bull trout.

#### *Spout Springs ski area*

The Spout Springs ski area is right on the watershed divide between the upper Lookingglass and North Fork Umatilla river watersheds and is far from fish-bearing streams. Operation of the ski area does not normally involve ground disturbing activities, and has no effect on fish habitat.

#### *Private inholdings (e.g. Lost Creek, introduced brook trout)*

Owners of private land inholdings in several subwatersheds in the analysis area have grazed their land and harvested timber. Detailed information about timber harvest, grazing, and other uses of private land are not available for this analysis. Brook trout may have been introduced to streams on some of these private lands as they have been found in Lost Creek downstream of a private land in-holding (DMC, personal observation, 1992).

### *Determinations of effect on the species and the process and rationale for the determination*

This project has been carefully designed to avoid adverse effects to fish and aquatic habitat but because the risk, although very small, cannot be entirely eliminated, alternative B of the Tollgate Fuels project May Affect, but is Not Likely to Adversely Affect Snake River steelhead, mid-Columbia Steelhead, Snake River Spring Chinook salmon, Snake River Fall Chinook salmon, or Columbia River bull trout or their designated critical habitat.

For the same reasons, alternative B of the Tollgate Fuels project May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species of Region 6 Sensitive redband trout or margined sculpin.

Since there would be no commitment of fisheries resources under Alternative B, or of resources essential to maintenance of listed fish or their habitat, neither would there be any irreversible or irretrievable commitment of fisheries resources.

### *Determinations of effect to Management Indicator species*

The Management Indicator Species (MIS) concept assumes that the status on one species can indicate the status of other species and their habitats. Rainbow/redband trout and steelhead, both *Oncorhynchus mykiss*, are designated as management indicator species for the Umatilla National Forest. Their status would be taken as an indication of the condition of the status of bull trout and Chinook salmon and their habitat

Rainbow/redband trout and steelhead are the most widespread salmonid species on the Umatilla National Forest, and also probably the hardiest. Therefore, the status of rainbow/steelhead trout does not tell us anything useful about the status of either bull trout or Chinook salmon and is not a satisfactory indicator of their habitat. Nevertheless, the effect of this project to *O. mykiss* as a management indicator species would be the same as effects to that species when evaluated as a R6 Sensitive species or an ESA Threatened species. That is to say that adverse effects or impacts are not expected.

### *Determinations of effect to Magnuson-Stevens Act Essential Fish Habitat*

For the same reasons given previously in the discussion of effects to habitat, the proposed Tollgate Fuels project May Affect, But Is Not Likely To Adversely Affect Magnuson-Stevens Act Essential Fish Habitat of Snake River spring/summer salmon, Snake River fall Chinook salmon or coho salmon.

### *Recommendations for removing, avoiding, or compensating for any adverse effects*

Adverse effects are not expected, so there are no recommendations for removing, avoiding or compensating for adverse effects of Tollgate Fuels project Alternative B.

## Alternative C

### *Direct, Indirect, and Cumulative Effects*

The hydrology section above describes the differences in direct, indirect, and cumulative effects on water quality, quantity, and watershed function—all of which are important components of fish habitat. Because the nature of the treatments are mostly the same as described above for Alternative B, the *nature* of potential effects to fishes and their habitats would be the same as described under the other action Alternative. The risks to aquatic biota would be slightly less than under Alternative B because of the reduced amount of treatment, but here too, because the risks cannot be entirely eliminated, the overall effect conclusions would be that same as under Alternative B. Likewise, risks of adverse cumulative effects would be of the same nature but reduced probability as under alternative B.

### *Consistency Findings with respect to applicable laws and regulations (Alternatives B and C)*

#### Umatilla Forest Plan

The consistency findings of the Tollgate Project with respect to applicable sections of the Umatilla Forest Plan are based on elements of water quality, water quantity, and watershed function as well as fish abundance and distribution. Such findings are also described earlier in the hydrology section of this chapter.

Two of the watersheds included in the project area, which have ESA listed fish, have not had watershed analyses prepared and so would be inconsistent with the Forest Plan/Pacfish in this regard. The other Watershed (Umatilla River) has had a watershed analyses and so would be consistent with the Forest Plan/Pacfish in that regard. A Forest Plan amendment which would make the Forest Plan consistent with the alternative B of the Tollgate Fuels project is included as part of the Alternative.

## FOREST VEGETATION - SILVICULTURE

Three indicators are used to characterize the environmental consequences of implementing the silvicultural activities proposed for each of the alternatives: species composition (forest cover types), forest structural stages, and tree density classes. Potential vegetation is not used as an indicator because it is not affected by silvicultural activity or management treatment; however, the amount of potential vegetation included in each alternative does vary, as shown in Table 4-5.

**Table 4-5 — Potential vegetation group acreage for the Affected Environment and by Alternative**

| PVG Code | Affected Environment | Alternative A | Alternative B | Alternative C |
|---|---|---|---|---|
| Cold UF | 277 | 0 | 96 | 96 |
| Dry UF | 1574 | 0 | 141 | 102 |
| Moist UF | 35715 | 0 | 3980 | 3555 |
| Total | 37,566 | 0 | 4218 | 3753 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS acres only). PVG codes are described in Powell et al. (2007) and Table F1 in Appendix F.

## Alternative A

Alternative A, the No Action Alternative, allows previously approved (on-going) activities to proceed, but none of the silvicultural activities included in the proposed action would be implemented under Alternative A. Under this Alternative ongoing disturbance and succession processes influencing vegetation conditions in the Tollgate planning area would continue as they have in the recent past. Since no new forest vegetation activities would occur under this Alternative, it would not provide an opportunity to address species composition, forest structure, or tree density conditions that are either over-represented or under-represented with respect to HRV or fire and fuels management objectives in the

Tollgate WUI. Alternative A would not implement any of the silvicultural activities; thus, it is not expected to have any direct, indirect, or cumulative effects on the forest vegetation Affected Environment.

Although no effects are expected resulting from any silvicultural activities implemented under Alternative A (because there are no activities), the environmental consequences of adopting Alternative A would nonetheless occur. In short, implementing Alternative A would allow successional and disturbances processes to occur without the influence of activities described under Alternatives B or C, and would thereby result in different characteristics of vegetation composition, structure, and density within the project area. These successional and disturbance processes, and the resulting patterns of species composition, density, and forest structure, have been broadly described for the forest ecosystems of the Blue Mountains in Powell (2000) and references therein.

By reducing the occurrence of wildfire disturbance within the Tollgate project area, fire suppression and exclusion activities have had, and would have for the foreseeable future important effects on forest vegetation. These effects are well-understood and thoroughly described (Powell 2000 and references therein). And in combination with fire exclusion and suppression, allowing non-anthropogenic successional and disturbance processes to shape present and future vegetation conditions within the Tollgate forest Affected Environment would also have predictable consequences. These include:

- Transition toward (and further over-representation of) mid and late-seral species, and further reductions of early seral species abundance and distribution.
- Transition toward (and further over-representation of) understory reinitiation and old forest (particularly multi-story) structure types, and further reductions of under-represented stem exclusion and stand initiation forest structure types.
- Transition toward (and further over-representation of) high-density forests, at the expense of under-represented low and moderate-density forests.
- Increased susceptibility to (and tree damage/mortality resulting from) insect, dwarf mistletoe, and disease disturbances is expected to generally increase across the project area as sites increase in density, canopy layering, and the relative abundance of Douglas-fir, spruce, and true firs (Appendix C, Schmitt and Powell 2005, Hessburg et al. 1999a and 1999b, Powell 2000 and references therein). Indeed, as noted in Powell (2000):

> Plant succession in combination with human influence and extremes in weather are the primary ingredients of forest health declines; insect outbreaks and disease epidemics may be little more than symptoms of an underlying problem (Sloan 1998, Steele 1994).

## Alternative B

Three indicators are used to present pre-treatment and post-treatment trends for vegetation conditions: species composition, forest structural stages, and tree density classes. These indicators will also be briefly summarized in terms of changes to insect, disease, and wildfire risk and susceptibility.

### *Direct and Indirect effects*

#### Species Composition

Species composition, as represented using forest cover types, is expected to change only slightly in response to implementation of silvicultural activities proposed for Alternative B (Table 4-6). In most locations, improvement cutting and low thinning would focus on the removal of late-seral trees in subordinate canopy positions, and leave a well-stocked stand of remaining trees composed predominantly of the original species characterizing the cover type. As a result, the direct effects of implementing the proposed activities on species composition within the treatment units would be relatively minor. For some stands, improvement cutting within the canopy focusing on retention of early or mid-seral species (western larch and Douglas-fir, respectively) and removal of late-seral species (true firs and Engelmann spruce) would result in the respective changes of these cover types indicated by Table 4-6. Across the areas of forest vegetation Affected Environment included in Alternative B, however, the relative magnitude of these changes would be small (less than 7 percent, Table 4-6).

Over time, across the project treatment area, processes of ecological succession would continue to favor the dominance of late-seral, shade-tolerant tree species over early-seral, intolerant trees in the absence of wildfire events (Powell 2000, Agee 1996a). Insect, disease, and windthrow and other disturbances would also generally accelerate this trend, although windthrow disturbances are known to favor the development of western larch in some minor instances. Understory biodiversity would generally be maintained or even initially increase as a result of implementing the proposed activities, because the species typical of moist upland environments do well in partial shade produced by natural disease, insect, or blowdown disturbance. One exception to this effect on species richness may occur in units receiving mastication activities, which are discussed below.

**Table 4-6 — Species composition for the portion of the forest vegetation Affected Environment included in Alternative B**

| Forest Cover Type | Pre- Implementation | | Post- Implementation | | Difference |
|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | (Acres) |
| **Ponderosa pine** | 154 | 4 | 154 | 4 | + 0 |
| **Douglas-fir** | 184 | 4 | 226 | 5 | + 42 |
| **Western larch** | 149 | 4 | 318 | 8 | + 169 |
| **Lodgepole pine** | 434 | 10 | 434 | 10 | + 0 |
| **Grand fir** | 1251 | 30 | 1295 | 31 | + 44 |
| **Broadleaved species** | 208 | 5 | 208 | 5 | + 0 |
| **Spruce-fir** | 1837 | 44 | 1581 | 37 | – 255 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS lands on the portion of the forest vegetation Affected Environment included within Alternative B – approximately 4,218 acres).

### Forest Structure

Forest structure, as represented using structural stages, is expected to change in response to implementation of silvicultural activities proposed for Alternative B (Table 4-7). Although some of the existing old-forest stands (OFMS and OFSS) would be affected by proposed silvicultural activities in these Alternatives, the overall amount of old forest is not expected to decrease after implementation because only improvement cutting is proposed for existing old-forest stands, and because the proposed improvement cutting would leave at least 10 trees per acre equal to or greater than 21 inches DBH, the post-treatment structural stage remains old forest after intermediate activities are implemented. Structural changes in old-forest stands would involve a shift from multi-story (OFMS) to single story structures (OFSS). Structural development of these stands could over time transition to any number of structure types, depending on future disturbances and climatic envelopes suitable for species regeneration. In the absence of fire disturbances, most structures in the moist upland forest biophysical environment would experience some level of natural regeneration following thinning, which would need periodic maintenance to maintain desired canopy fuel characteristics. Alternatively, OFSS structures in areas with a big huckleberry shrub understory present and/or dominant would possibly be self-perpetuating over the course of many decades under a low or mixed-severity fire regime (Figure 4-1). The primary difference between the effects of removing trees >21” DBH in several units under Alternative B relative to Alternative C is that more sub-dominant trees in the canopy would be removed under Alternative B in order to attain final residual fuels and tree density objectives, but this would generally not affect the distribution of structural classifications described in this chapter.

The stand initiation (SI) and understory Reinitiation (UR) structural stages decrease as a direct effect of implementing Alternative B (Table 4-7), because the proposed improvement cutting and low thinning silvicultural activities remove all or a part of the seedling and sapling-sized trees within the treated stands. These stands are generally converted to the stem exclusion (SE) stage, which increases as a result of implementing the proposed activities. In some locations without a strong shrub component, the structural changes resulting from the proposed activities would be only temporary as understory trees establish and grow. The characteristic structural shift for this process would be a conversion from SE stands back to UR stages. Conversely, in other areas where shrub species like big huckleberry dominate, tree regeneration could be significantly limited for many years or even decades.

**Table 4-7 — Forest structural stages for the portion of the forest vegetation Affected Environment included in Alternative B**

| Structural Stage | Pre-Implementation | | Post- Implementation | | Difference |
|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | (Acres) |
| SI | 177 | 4 | 79 | 2 | – 98 |
| SE | 352 | 8 | 1143 | 27 | + 792 |
| UR | 1085 | 26 | 391 | 9 | – 695 |
| OFMS | 1262 | 30 | 235 | 28 | – 1027 |
| OFSS | 1342 | 32 | 2368 | 37 | + 1027 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS lands on the portion of the forest vegetation Affected Environment included within Alternative B – approximately 4,218 acres).

### Tree Density

Tree density classes are expected to change in response to implementation of silvicultural activities proposed for Alternative B ( Table 4-8 ). One direct effect of implementing the silvicultural activities is expected to be a consistent reduction in tree density for the treatment units; however, in some treatment unit the reduction would not be enough to cross break points between density classes. As a result, most, but not all treated units would drop from the High to Moderate, or Moderate to Low classes. At the same time, no units would increase in density, and no areas are expected to convert directly from the High to Low classes. The net effect would be an increase in the Low to Moderate density classes, at the expense of the High density class ( Table 4-8 ). In the absence of fire disturbances, most structures in the moist upland forest biophysical environment would experience some level of natural regeneration following thinning, which would need periodic maintenance to maintain desired canopy fuel and density characteristics. Because no differences exist in the prescribed residual tree density among the acres affected under Alternatives B or C, no differences would result from retaining all trees >21” DBH.

**Table 4-8 — Tree density classes for the portion of the forest vegetation Affected Environment included in Alternative B**

| Tree Density Class | Pre-Implementation | | Post-Implementation | | Difference |
|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | (Acres) |
| Low | 198 | 5 | 485 | 11 | + 287 |
| Moderate | 430 | 10 | 3504 | 83 | + 3074 |
| High | 3590 | 85 | 229 | 5 | – 3,361 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forested NFS lands on the portion of the forest vegetation Affected Environment included within Alternative B – approximately 4,218 acres).

**Figure 4-1 — Example stand conditions of an Old Forest Single Stratum (OFSS) moist upland forest site, to which many Old Forest Multi Stratum structures would be converted as a result of implementing the activities proposed under Alternatives B and C.[24]**

[24] These conditions may be self-perpetuating and limit recruitment of understory trees (seedlings and saplings less than 5-inches in diameter) on moist sites due to the dense cover of big huckleberry (*Vaccinium membranaceum*), a clonal species that reproduces primarily from deep-rooted rhizomes and by sprouting at the root collar (Simonin 2000). On sites such as the one pictured here, big huckleberry is functioning as the dominant undergrowth species in stands considered to be the potential natural community (e.g., climax). In these climax plant communities, big

In most locations, improvement cutting and low thinning would focus on the removal of late-seral trees in subordinate canopy positions, and leave a well-stocked stand of remaining trees composed predominantly of the original species characterizing the cover type. As a result, the direct and indirect effects of implementing the proposed activities on species composition would be relatively minor. For some stands, improvement cutting within the canopy focusing on retention of early or mid-seral species (western larch and Douglas-fir, respectively) and removal of late-seral species (true firs and Engelmann spruce) would result in the minor respective increases and decreases of these cover types indicated by Table 4-6 and Table 4-9.

**Table 4-9 — Species composition for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative B**

| Forest Cover Type | Pre-Implementation Acres | Pre-Implementation Percent | Post-Implementation Acres | Post-Implementation Percent | Difference (Acres) |
|---|---|---|---|---|---|
| **Ponderosa pine** | 2465 | 7 | 2465 | 1 | No change |
| **Douglas-fir** | 9885 | 26 | 9927 | 26 | + 42 |
| **Western larch** | 1045 | 3 | 1215 | 3 | + 169 |
| **Lodgepole pine** | 3269 | 9 | 3269 | 9 | No change |
| **Grand fir** | 10416 | 28 | 10460 | 28 | + 44 |
| **Broadleaved species** | 578 | 2 | 578 | 2 | No change |
| **Spruce-fir** | 9907 | 26 | 9653 | 26 | – 255 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres), and reflecting the direct/indirect effects of implementing Alternative B (affecting approximately 4218 acres of the Affected Environment).

### Historic Range of Variability (HRV)

An HRV analysis was completed for species composition, forest structure, and tree density of the forest vegetation as it would exist after implementation of Alternative B. Because they vary by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Cold upland forest PVG was not included because it has too few acres (277) for a credible HRV analysis.

#### *Species Composition*

Species composition HRV results are presented in Table 4-10.

Silvicultural activities proposed for implementation in Alternative B would have minimal effect on HRV results regarding species composition: no cover types moved inside or outside their respective historic ranges of variability as a result of implementing the activities.

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huckleberry is able to capture a substantial amount of the growing space and thereby preclude tree seedling establishment (or establishment of other non-tree vascular plant species). Periodic fires on these mixed-severity (fire regime III) sites had the effect of top-killing the huckleberry plants and initiating a new huckleberry cohort from the extensive rhizome system. Sparse tree establishment occurs during the multi-decade post-fire recovery period between initiation of new huckleberry shoots and eventual development of mature huckleberry plants, at which point huckleberry is able to exclude other plants once again (Simonin 2000). [Photo source: image acquired by D.C. Powell on a moist upland forest PVG site.]

**Table 4-10 — HRV analysis of species composition for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative B**

| | DRY UPLAND FOREST PVG | | | | MOIST UPLAND FOREST PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Post-treatment | | Historical Range | | Post-treatment | |
| Cover Type | Percent | Acres | Percent | Acres | Percent | Acres | Percent | Acres |
| Western juniper | 0-5 | 0-1786 | 0 | 0 | — | | — | |
| Ponderosa pine | 50-80 | 787-1259 | 51 | 800 | 5-15 | 1786-5357 | 5 | 1665 |
| Douglas-fir | 5-20 | 79-315 | 21 | 326 | 15-30 | 5357-10715 | 27 | 9601 |
| Western larch | 1-10 | 16-157 | 0 | 0 | 10-30 | 3572-10715 | 3 | 1215 |
| Broadleaved trees | 0-5 | 0-79 | 0 | 0 | 1-10 | 357-3572 | 2 | 578 |
| Lodgepole pine | | | | | 25-45 | 8929-16072 | 9 | 3196 |
| Western white pine | 0-5 | 0-79 | 0 | 0 | 0-5 | 0-1786 | 0 | 0 |
| Grand fir | 1-10 | 16-157 | 28 | 448 | 15-30 | 5357-10715 | 28 | 10012 |
| Spruce-fir | | | — | | 1-10 | 357-3572 | 26 | 9448 |

*Sources/Notes:* Current amounts are summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres, except for 277 acres of cold upland forest not included in this analysis), and reflecting the direct/indirect effects of implementing Alternative B (affecting approximately 4,218 acres of the Affected Environment). Gray shading indicates cover types that are either above or below the historical range of variability. Historical ranges were adapted by the author of this specialist report from Morgan and Parsons (2001); they are based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regimes.

### *Forest Structure*

Table 4-11 shows that the direct effects of implementing silvicultural activities associated with Alternative B have has a minor, but noticeable cumulative effect on forest structure when spread across the entire forest vegetation. As a result of implementing Alternative B, the representation of five structural stages (SI, SE, UR, OFMS and OFSS) is expected to change, but not enough to modify their respective portions by more than 5%. The representation of the SI structural stage is expected to change by less than 1% (Table 4-11).

**Table 4-11 — Forest structural stages for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative B**

| | Pre-Implementation | | Post- Implementation | | Difference |
|---|---|---|---|---|---|
| Structural Stage | Acres | Percent | Acres | Percent | (Acres) |
| SI | 2176 | 6 | 2078 | 6 | – 98 |
| SE | 3184 | 8 | 3989 | 11 | + 805 |
| UR | 7746 | 21 | 7039 | 19 | – 707 |
| OFMS | 11600 | 31 | 10573 | 28 | – 1,027 |
| OFSS | 12859 | 34 | 13886 | 37 | + 1,027 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres), and reflecting the direct/indirect effects of implementing Alternative B (affecting approximately 4,218 acres of the Affected Environment).

An HRV analysis was completed for forest structure as it would exist after implementation of Alternative B. Because the historic ranges of variability for forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (277) for a credible HRV analysis.

Forest structure HRV results are presented in Table 4-12.

**Table 4-12 — HRV analysis of forest structural stages for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative B**

| Structural Stage | DRY UPLAND FOREST PVG | | | | MOIST UPLAND FOREST PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Post-treatment | | Historical Range | | Post-treatment | |
| | Percent | Acres | Percent | Acres | Percent | Acres | Percent | Acres |
| SI | 15-25 | 236-394 | 17 | 260 | 20-30 | 7143-10715 | 5 | 1796 |
| SE | 10-20 | 157-315 | 2 | 25 | 20-30 | 7143-10715 | 11 | 3964 |
| UR | 5-10 | 79-157 | 8 | 123 | 10-20 | 3572-7143 | 19 | 6788 |
| OFMS | 5-15 | 79-236 | 29 | 451 | 15-20 | 5357-7143 | 28 | 10104 |
| OFSS | 40-60 | 630-944 | 45 | 714 | 10-20 | 3572-7143 | 37 | 13063 |

*Sources/Notes:* Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres, except for 277 acres of cold upland forest not included in this analysis), and reflecting the direct/indirect effects of implementing Alternative B (affecting approximately 4,218 acres of the Affected Environment). Gray shading indicates structural stages that are above or below the historical range of variability. Historical percentages (H%) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Martin (2010).

Having an ecologically appropriate representation of forest structural stages (with increased proportions of SE and OFSS structure types and decreased proportions of OFMS and UR structures) well-distributed throughout the Tollgate planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation–particularly because such a representation are generally more conducive to project goals of fuel reduction and mitigation of wildfire hazard.

The information presented in Table 4-12 suggests that the silvicultural activities proposed for implementation in Alternative B had a modest effect on structural stage status with respect historic ranges of variability. Before implementation, the Dry UF PVG had 2 structural stages that were outside of HRV and the Moist UF PVG had 5 structural stages that were outside of HRV (Table 3-24). After implementation, the Dry UF PVG still would 2 structural stages that are outside of HRV and the Moist UF PVG would have 4 structural stages that are outside of HRV (Table 4-12). With the exception of the SI and OFSS structural stages, for stages initially outside of HRV for both the moist and dry upland biophysical environments, activities proposed under Alternative B would move the stage distribution closer to historic ranges. For the Moist UF PVG, proposed activities resulted in the understory reinitiation structural stage reaching the historical range – UR was above the range at 21% of the pre-treatment Affected Environment (Table 3-24) and Alternative B implementation reduced it to 19%, which is within the historical range (Table  4-12). The proposed activities maintained all ecosystem characteristics (structural classes) already within ranges of variability expected to occur under natural disturbance regimes.

### *Tree Density*

Table 4-13 shows that the direct effect of implementing Alternative B has an impact on tree density. As a result of implementing Alternative B, the representation of all three tree density classes changes in one direction or another: the low density class increases from 9 to 10%, the moderate class increases from 15 to 23%, and the high class decreases from 76 to 67%. In all cases, tree density decreased as a result of implementing the activities proposed under Alternative B; therefore, both the low and moderate density classes increased due to site conversions from the moderate to high classes, respectively.

**Table 4-13 — Tree density classes for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative B**

| Tree Density Class | Pre-Implementation | | Post-Implementation | | Difference |
|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | (Acres) |
| **Low** | 3356 | 9 | 3643 | 10 | + 287 |
| **Moderate** | 5548 | 15 | 8635 | 23 | + 3087 |
| **High** | 28662 | 76 | 25288 | 67 | – 3,374 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres), and reflecting the direct/indirect effects of implementing Alternative B (affecting approximately 4,218 acres of the Affected Environment).

An HRV analysis was completed for tree density of the forest vegetation. Tree density HRV results are presented in Table 4-14.

Having an ecologically appropriate representation of tree (stand) density classes well distributed throughout the Tollgate planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 4-14 suggests that implementing Alternative B would result in mixed outcomes regarding tree density, at least in the context of HRV. Before implementation, the Dry UF PVG had 2 tree density classes that were outside of HRV and the Moist UF PVG had 3 density classes that were outside of HRV (Table 3-26). After implementation, the Dry UF PVG would increase to 3 density classes outside of HRV and the Moist UF PVG would still have 3 density classes outside of HRV (Table 4-14).

For the Moist UF PVG, proposed activities resulted in the low density class increasing from 9 to 10%, which results in this class remaining outside the historical range; the moderate density class increased from 14 to 22%, both of which are below the historical range; and the high density class was reduced from 77 to 68%, remaining above the historical range after Alternative implementation.

**Table 4-14 — HRV analysis of tree density classes for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative B**

| Tree | DRY UPLAND FOREST PVG | MOIST UPLAND FOREST PVG |
|---|---|---|

| Density Class | Historical Range | | Post-treatment | | Historical Range | | Post-treatment | |
|---|---|---|---|---|---|---|---|---|
| | Percent | Acres | Percent | Acres | Percent | Acres | Percent | Acres |
| Low | 40-85 | 630-1338 | 5 | 83 | 20-40 | 7143-14286 | 10 | 3508 |
| Moderate | 15-30 | 236-472 | 32 | 498 | 25-60 | 8929-21429 | 22 | 8035 |
| High | 5-15 | 79-236 | 63 | 993 | 15-30 | 5357-10715 | 68 | 24172 |

*Sources/Notes:* Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres, except for 277 acres of cold upland forest not included in this analysis), and reflecting the direct/indirect effects of implementing Alternative B (affecting approximately 4,218 acres of the Affected Environment). Gray shading indicates tree density classes that are above or below the historical range of variability. Historical ranges were taken from Schmitt and Powell (1998).

As expected, for the Dry UF PVG, proposed activities did not affect the low density class. For the moderate density class, proposed activities would move the class slightly outside the historical range (from 30 to 32%) as a result of conversions from the high density class, which would drop from 65 to 63%.

With the exception of the Moderate tree density class in the Dry UF PVG, the proposed activities maintained all ecosystem characteristics (structural classes) already within ranges of variability expected to occur under natural disturbance regimes. Why wouldn't implementation of the silvicultural activities associated with Alternative B result in more moving within historical ranges for species composition, forest structure, and tree density? This outcome is generally related to two factors:

1. A relatively low proportion of area (acreage) is being treated (Table 4-13), which limits the opportunity to change under- or over-represented forest cover types.
2. Proposed silvicultural activity units cannot generally address every issue simultaneously. Very few individual units address all three of the primary forest vegetation issue categories (composition, structure, density) simultaneously, so certain activity units directed toward a specific issue (such as composition) may have a neutral or negative effect on another issue (such as structure or density), depending on a unit's suitability for addressing issues and priority setting between units. In general, the treatment priority was to address issues of forest structure and density, and not species composition – although minor, favorable trends for composition with respect to historic ranges of variability are anticipated.

### Risk/Susceptibility to windthrow, insect and disease disturbances

Not all insect and disease organisms are influenced by high levels of stand density, but research has shown that Armillaria root disease, Douglas-fir beetle, Douglas-fir tussock moth, fir engraver, Indian paint fungus, mountain pine beetle, spruce beetle, western pine beetle, and western spruce budworm do seem to respond positively to high tree density (Powell 1999, and the literature citations contained in that source). Trees with increased insect or disease susceptibility often occur in dense forests where they face greater competition for soil moisture, nutrients, and other resources. Ponderosa pines in high-density stands, for example, have lower xylem water potentials and rates of photosynthesis, indicating greater drought stress. These trees also have decreased resin production and foliar toughness, suggesting reduced resistance to insect and pathogen attack (Kolb et al. 1998).

Post-treatment tree density levels reaching the "lower limit of the management zone" stocking value, as identified in Powell (1999), are expected to reduce insect and disease susceptibility to acceptable levels for 15-20 years into the future. Residual tree density levels occurring at the mid-point of the management zone (defined as halfway between the upper and lower management zone levels), or above the mid-point but below the upper limit, would reduce insect and disease susceptibility to acceptable levels for no more than 5-10 years.

Western conifer forests experience periodic drought in response to recurring climate cycles such as the Pacific Decadal Oscillation (Heyerdahl et al. 2001, 2002, 2008a, 2008b; Kitzberger et al. 2007), and trees growing in dense stands are thought to be especially vulnerable to insect or disease attack and mortality during dry periods such as drought (Smith et al. 2005).

#### *Bark beetles*

Research studies found that tree mortality caused by mountain pine beetle, a bark beetle species affecting mature lodgepole pines and second-growth (immature) ponderosa pines, was insignificant until a threshold stand density was reached, at which point mortality quickly became substantial (Cochran 1992, Cochran and Barrett 1993, Mitchell et al. 1983, Oliver 1995, and many other insect or disease literature citations contained in a Best Available Science review for a recent, nearby, similar project – see Powell 2009a).

Thinning a lodgepole pine stand increases tree vigor and resistance to mountain pine beetle (Mitchell et al. 1983); fewer trees are killed in heavily thinned stands as compared to lightly thinned or unthinned stands (Preisler and Mitchell 1993, Schmitz et al. 1989, Whitehead and Russo 2005). Waring and Pitman (1985) also noted that the risk of a mountain pine beetle outbreak "can be greatly reduced by periodic thinning," and that improved bark-beetle resistance develops within three years of the thinning treatment.

Once trees respond to a thinning (usually 3-5 years after treatment), their improved vigor promotes production of defensive chemical compounds enhancing beetle resistance (Christiansen et al. 1987, Franceschi et al. 2005, Kolb et al. 1998, Mitchell and Martin 1980, Shrimpton 1978). Thinning activities contributing to high tree vigor levels could help forestall development of "focus trees" that function as bark beetle attractant (Eckberg et al. 1994).

#### *Defoliators*

Stand density influences insects and diseases other than bark beetles, such as tree defoliators. Although changes in the abundance of susceptible host cover types are not expected to appreciably diminish as a result of implementing the activities proposed under Alternatives B and C, a reduction of canopy layering and overall host tree density are expected to have notable effects on overall susceptibility. Carlson and Wulf (1989) concluded that thinning provided short-term protection against western spruce budworm for treated stands, and that it would presumably contribute to long-term budworm resistance once landscape-size areas were treated. In general, reducing stand density, particularly by separating tree crowns, and reducing canopy layering reduces overall susceptibility to defoliating insects such as the Douglas-fir tussock moth and western spruce budworm (Heller and Sader 1980, Schmitt and Powell 2005, Steele et al. 1996 and references therein, Stosczek et al. 1981, Weatherby et al. 1993). For ponderosa pine infected with dwarf mistletoe, Barrett and Roth (1985) found that wide spacing after thinning allowed residual trees to develop full crowns and acceptable vigor levels, despite heavy infection levels. Similar results were obtained for Douglas-fir dwarf mistletoe (Knutson and Tinnin 1986).

#### *Root diseases and dwarf mistletoes*

A tendency toward greater tree mortality has been observed for stands with high density (Filip et al. 1989c). Thinning increases host vigor and resistance to Armillaria; it can also improve resistance by modifying the proportion of hosts to non-hosts in a stand (Schmitt 1999). In a study involving thinned, fertilized, and untreated stands, Armillaria infection rates were lowest in thinned stands, and highest in fertilized stands; infected Douglas-fir stands should be thinned when trees are small rather than large (Entry et al. 1991).

While thinning within the Tollgate area may slow disease and mistletoe spread, and prevent occurrence in many areas, it should not be expected to significantly lower existing rates of infection – particularly when root disease and mistletoe host species remain abundant and/or dominant within a stand (Appendix C). In fact, incidence and severity of Armillaria root disease is increased by soil compaction and displacement, which is often associated with sites having had multiple entries where ground-based skidding was done. Armillaria is also amplified by later successional and high-graded stand structure and composition where susceptible hosts are a dominant component (Appendix C). Thus, in many locations where Armillaria and other root diseases (Indian paint fungus, Annosus root disease, and laminated root rot) are currently present and actively killing trees, it should be expected that slow but steady mortality would continue to occur among all size classes of true firs and Engelmann spruce, and incidental amounts of pine and larch. Tree mortality would result in canopy gaps generally filled in by shade-tolerant true firs and spruce, with an overall trend of creating a multi-layered canopy dominated by shade-tolerant species over the course of several years or decades (Appendix C, Craig Schmitt, personal communication 2011). Initial activities to reduce ladder fuels and create a single canopy layer would require periodic, follow-up maintenance to thin regeneration (or perform regeneration harvests) created in canopy gaps.

#### *Windthrow*

Windthrow events are an intermittent occurrence on the upland plateau where the Tollgate project would occur. Known significant events affecting large areas occur perhaps once or twice per decade, but smaller, chronic events occur more frequently among susceptible stands such as those associated with the nearby Abla timber sale. Past damage in the area has been generally highest among recently and heavily thinned stands (generally with 50-70 $ft^2$/ac of residual basal area or less), high points, ridge tops, plateau rims, and/or areas with shallow productive soils. Subalpine fir, Engelmann spruce, and grand fir are considered most susceptible due to a shallow rooting habit, with lodgepole pine and western white pine associated with moderate susceptibility. Although structural, edaphic and topographic conditions may present windthrow risks to all species, western larch, Douglas-fir, and ponderosa pine are generally known for a deep rooting habit which is considered relatively wind-firm (all species risk ratings found in Powell 2000, Appendix 2).

Substantial variability of forest density exists across the areas affected by proposed actions, but high-density forests are most abundant (Table 3-25). Dense stands with trees characterized by high height/diameter ratios which undergo a significant thinning may be at risk of windthrow damage.

The activities proposed under Alternatives B are not expected to significantly increase susceptibility to windthrow, particularly if the overall objective is to increase crown spacing to only 5-15 feet among individual dominant trees and retain well-stocked stands of moderate or high density (80-140 $ft^2$/ac). With care exercised by marking crews and attention to windthrow in susceptible locations (previously dense stands, high points, ridge tops, plateau rims, and/or areas with shallow productive soils), a balance can be struck to retain wind-firm clumps and/or minimize increases of canopy spacing, while still accomplishing fuels reduction objectives.

### *Cumulative effects*

Cumulative effects include the direct and indirect effects of implementing Alternative B in combination with overlapping (in time and space) direct and indirect effects of other past, present, and reasonably foreseeable future activities on forest vegetation. These activities are briefly indicated in the Scale of Analysis section, and for the Tollgate Fuels Reduction Project include fire suppression, fuelwood collection / roadside hazard tree removal, and hazard tree removal at administrative sites.

For each activity, three indicators are used to examine pre-treatment and post-treatment trends for a cumulative effects analysis of forest vegetation conditions: 1) species composition (forest cover types), 2) forest structural stages, and 3) tree density classes. Analysis is also included of the extent to which cumulative effects represented by any of these indicators may also reflect changes in susceptibility to insect and disease disturbances.

The direct and indirect effects of past actions on forest vegetation within the Tollgate project are represented by existing conditions as described in the Affected Environment section. The cumulative effects of past activities in combination with implementing activities proposed under Alternative B are thus described concurrently with the direct and indirect effects in the previous section.

### Fire suppression

The activities proposed under Alternative B would, cumulatively, have mitigating effects on successional transitions of species composition, changes in forest structure and tree density toward stem exclusion and old forest multi-strata stands, and increases in tree density. These mitigating effects are described in the Direct/indirect effects analysis for Alternative B. The cumulative effect of activities proposed under both Alternative B would slightly reverse the changes to species composition, structure, and density expected to result from implementing a fire suppression program (described in the effects analysis for Alternative A). Similarly, the mitigating, or counter-acting nature of the direct and indirect effects of the activities proposed under Alternative B are such that these activities would slightly reverse the changes in susceptibility to insect and disease disturbances already described as an environmental consequence of adopting Alternative A.

### Special Forest Products Gathering

The present and reasonably foreseeable special forest products program on the Walla Walla Ranger District involves the dispersed collection and removal of dead trees by members of the general public, as well as mushrooms, posts and poles, and other items. Because the program only allows the removal of dead trees along designated travel corridors, the cumulative effect of this program and the activities proposed under Alternative B on forest species composition, tree density, and forest structure are expected to be minimal and essentially imperceptible. Removal of dead trees for fuelwood collection removes some trees that would have otherwise been available for down woody debris and carbon and nitrogen cycling; however, dead trees which are too rotten and decomposed for fuelwood use are regularly bypassed by fuelwood collectors and thereby made available for nutrient cycling and other ecosystem processes. As a result, field reconnaissance across portions of the forest Affected Environment affected by fuelwood collection and the activities proposed under Alternative B indicates that existing and reasonably foreseeable levels currently and would continue to generally fall within ranges recommended by Graham et al. (1994) and Brown et al. (2003) to maintain site productivity for Dry and cold upland forests (5-10 tons of coarse woody debris per acre) and moist upland forests (10-25 tons per acre).

To the limited extent they may exist, cumulative effects on forest species composition, structure, and tree density associated with the activities proposed under Alternative B along with the District fuelwood collection program are not expected to have appreciable effects on susceptibility to windthrow, insect, or disease disturbances. Nevertheless, the cumulative effect of activities proposed under Alternative B, overlapping in space and time with District fuelwood collection activities, is expected, over the course of several decades, to include a very small increase in the incidence of Armillaria root disease above the levels discussed in the Direct/indirect effects section above for these Alternatives. This increase, however, is so minor as to be essentially imperceptible at the scale of individual forest stands and particularly the entire Tollgate project planning area.

# Alternative C

Alternative C has similar effects to those disclosed above for Alternative B. The major difference between the action alternatives is the number of acres affected by each alternative. Since they are similar, the effects disclosed below are similar to those above.

## *Direct and indirect effects*

### Species Composition

Species composition, as represented using forest cover types, is expected to change only slightly in response to implementation of silvicultural activities proposed for Alternative C (Table 4-15). As a result, just in alternative B, the direct and indirect effects of implementing the proposed activities on species composition would be relatively minor. For some stands, improvement cutting within the canopy focusing on retention of early or mid-seral species (western larch and Douglas-fir, respectively) and removal of late-seral species (true firs and Engelmann spruce) would result in the respective changes of these cover types indicated by Table 4-15.

**Table 4-15 — Species composition for the portion of the forest vegetation Affected Environment included in Alternative C**

| | Pre- Implementation | | Post- Implementation | | Difference |
|---|---|---|---|---|---|
| Forest Cover Type | Acres | Percent | Acres | Percent | (Acres) |
| Ponderosa pine | 144 | 4 | 144 | 4 | + 0 |
| Douglas-fir | 100 | 3 | 161 | 4 | + 61 |
| Western larch | 120 | 3 | 258 | 7 | + 138 |
| Lodgepole pine | 431 | 11 | 431 | 11 | + 0 |
| Grand fir | 1059 | 28 | 1126 | 30 | + 67 |
| Broadleaved species | 115 | 3 | 115 | 3 | + 0 |
| Spruce-fir | 1785 | 48 | 1519 | 40 | – 265 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres).

### Forest Structure

Effects to forest structure for alternative C, is expected to be similar to Alternative B in that structural stages are expected to change in response to implementation of silvicultural activities (Table 4-16).

The overall amount of old forest is not expected to decrease after implementation because only improvement cutting is proposed for existing old-forest stands, and because the proposed improvement cutting would leave at least 10 trees per acre equal to or greater than 21 inches DBH, the post-treatment structural stage remains old forest after intermediate activities are implemented. Structural changes in old-forest stands would involve a shift from multi-story (OFMS) to single story structures (OFSS).

**Table 4-16 — Forest structural stages for the portion of the forest vegetation Affected Environment included in Alternative C**

| | Pre-Implementation | | Post- Implementation | | Difference |
|---|---|---|---|---|---|
| Structural Stage | Acres | Percent | Acres | Percent | (Acres) |
| SI | 83 | 2 | 79 | 2 | – 4 |
| SE | 348 | 9 | 1037 | 28 | + 689 |
| UR | 1051 | 28 | 367 | 10 | – 684 |

| | | | | | |
|---|---|---|---|---|---|
| OFMS | 1156 | 31 | 237 | 6 | – 919 |
| OFSS | 1115 | 30 | 2034 | 54 | + 919 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forest vegetation Affected Environment included within Alternative C – approximately 3754 acres).

The stand initiation (SI) and understory reinitiation (UR) structural stages decrease as a direct effect of implementing Alternative C (Table 4-16), because the proposed improvement cutting and low thinning silvicultural activities remove all or a part of the seedling and sapling-sized trees within the treated stands.

The primary difference between the effects of removing trees >21” DBH in several units under Alternative B relative to Alternative C is that more sub-dominant trees in the canopy would be removed under Alternative B in order to attain final residual fuels and tree density objectives, but this would generally not affect the distribution of structural classifications described in this chapter.

### Tree Density

Effects to tree density classes are expected to similar to Alterntaive B in that there is expected to be a consistent reduction in tree density for the treatment units; however, in some treatment units the reduction would not be enough to cross break points between density classes. As a result, most, but not all treated units would drop from the High to Moderate, or Moderate to Low classes. At the same time, no units would increase in density, and no areas are expected to convert directly from the High to Low classes. The net effect for the Affected Environment would be an increase in the Low to Moderate density classes, at the expense of the High density class (Table 4-17). Because no differences exist in the prescribed residual tree density among the acres affected under Alternatives B or C, no differences would result from retaining all trees >21” DBH.

**Table 4-17 — Tree density classes for the portion of the forest vegetation Affected Environment included in Alternative C**

| Tree Density Class | Pre-Implementation | | Post-Implementation | | Difference |
|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | (Acres) |
| **Low** | 184 | 5 | 433 | 12 | + 249 |
| **Moderate** | 360 | 10 | 3100 | 83 | + 2740 |
| **High** | 3210 | 86 | 221 | 6 | – 2989 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (forest vegetation Affected Environment included within Alternative C – approximately 3754 acres).

### Historic Range of Variability (HRV)

An HRV analysis was completed for species composition, forest structure, and density of the forest vegetation as it would exist after implementation of Alternative C. Because these categories vary by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Cold upland forest PVG was not included because it has too few acres (277) for a credible HRV analysis.

#### *HRV-Species Composition*

Species composition HRV results are presented in Table 4-18.

**Table 4-18 — HRV analysis of species composition for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative C**

| | DRY UPLAND FOREST PVG | | | | MOIST UPLAND FOREST PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Post-treatment | | Historical Range | | Post-treatment | |
| Cover Type | Percent | Acres | Percent | Acres | Percent | Acres | Percent | Acres |
| Western juniper | 0-5 | 0-1786 | 0 | 0 | — | | — | |
| Ponderosa pine | 50-80 | 787-1259 | 51 | 800 | 5-15 | 1786-5357 | 5 | 1665 |
| Douglas-fir | 5-20 | 79-315 | 21 | 326 | 15-30 | 5357-10715 | 27 | 9620 |
| Western larch | 1-10 | 16-157 | 0 | 0 | 10-30 | 3572-10715 | 3 | 1183 |
| Broadleaved trees | 0-5 | 0-79 | 0 | 0 | 1-10 | 357-3572 | 2 | 578 |
| Lodgepole pine | | | | | 25-45 | 8929-16072 | 9 | 3197 |
| Western white pine | 0-5 | 0-79 | 0 | 0 | 0-5 | 0-1786 | 0 | 0 |
| Grand fir | 1-10 | 16-157 | 28 | 448 | 15-30 | 5357-10715 | 28 | 10032 |
| Spruce-fir | | | — | | 1-10 | 357-3572 | 26 | 9442 |

*Sources/Notes:* Current amounts are summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres, except for 277 acres of cold upland forest not included in this analysis), and reflecting the direct/indirect effects of implementing Alternative C (affecting approximately 3754 acres of the Affected Environment). Gray shading indicates cover types that are either above or below the historical range of variability. Historical ranges were adapted by the author of this specialist report from Morgan and Parsons (2001); they are based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regimes.

The table suggests that the silvicultural activities proposed for implementation in Alternative C would have minimal effect on HRV results regarding species composition: no cover types moved inside or outside their respective historic ranges of variability as a result of implementing the activities.

#### *HRV- Forest Structure*

Table 4-19 shows that the direct effects of implementing silvicultural activities associated with Alternative C have a minor, but noticeable cumulative effect on forest structure when spread across the entire forest vegetation Affected Environment. As a result of implementing Alternative C, the representation of five structural stages (SI, SE, UR, OFMS and OFSS) is expected to change, but not enough to modify their respective portions of the Affected Environment by 5% or more. The representation of the SI structural stage is expected to change by less than 1% (Table 4-19).

**Table 4-19 — Forest structural stages for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative C**

| | Pre-Implementation | | Post- Implementation | | Difference |
|---|---|---|---|---|---|
| Structural Stage | Acres | Percent | Acres | Percent | (Acres) |
| SI | 2176 | 6 | 2172 | 6 | – 4 |
| SE | 3184 | 8 | 3891 | 10 | + 707 |
| UR | 7746 | 21 | 7044 | 19 | – 702 |
| OFMS | 11600 | 31 | 10662 | 28 | – 938 |
| OFSS | 12859 | 34 | 13797 | 37 | + 938 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres), and reflecting the direct/indirect effects of implementing Alternative C (affecting approximately 3,900 acres of the Affected Environment).

**Table 4-20 — HRV analysis of forest structural stages for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative C**

| Structural Stage | DRY UPLAND FOREST PVG | | | | MOIST UPLAND FOREST PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Post-treatment | | Historical Range | | Post-treatment | |
| | Percent | Acres | Percent | Acres | Percent | Acres | Percent | Acres |
| SI | 15-25 | 236-394 | 17 | 260 | 20-30 | 7143-10715 | 5 | 1891 |
| SE | 10-20 | 157-315 | 2 | 25 | 20-30 | 7143-10715 | 11 | 3866 |
| UR | 5-10 | 79-157 | 8 | 123 | 10-20 | 3572-7143 | 19 | 6793 |
| OFMS | 5-15 | 79-236 | 29 | 451 | 15-20 | 5357-7143 | 29 | 10194 |
| OFSS | 40-60 | 630-944 | 45 | 714 | 10-20 | 3572-7143 | 36 | 12975 |

*Sources/Notes:* Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres, except for 277 acres of cold upland forest not included in this analysis), and reflecting the direct/indirect effects of implementing Alternative C (affecting approximately 3754 acres of the Affected Environment). Gray shading indicates structural stages that are above or below the historical range of variability. Historical percentages (H%) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Martin (2010).

The information presented in Table 4-20 suggests that the silvicultural activities proposed for implementation in Alternative C had a modest effect on structural stage status with respect historic ranges of variability. Before implementation, the Dry UF PVG had 2 structural stages that were outside of HRV and the Moist UF PVG had 5 structural stages that were outside of HRV. After implementation, the Dry UF PVG still would 2 structural stages that are outside of HRV and the Moist UF PVG would have 4 structural stages that are outside of HRV (Table 4-20).

With the exception of the SI structural stage, for stages initially outside of HRV for both the moist and dry upland biophysical environments, activities proposed under Alternative C would move the relative distribution closer to historic levels. For the Moist UF PVG, proposed activities resulted in the understory reinitiation structural stage reaching the historical range – UR was above the range at 21% of the pre-treatment and Alternative C implementation reduced it to 19%, which is within the historical range (Table 4-20).

### *HRV- Density*

Table 4-21 shows that the direct effect of implementing Alternative C has an obvious impact on tree density when spread across the entire forest vegetation. As a result of implementing Alternative C, the representation of all three tree density classes changes in one direction or another: the low density class increases from 9 to 10%, the moderate class increases from 15 to 22%, and the high class decreases from 76 to 68%. In all cases, tree density decreased as a result of implementing the activities proposed under Alternative C; therefore, both the low and moderate density classes increased due to site conversions from the moderate to high classes, respectively.

**Table 4-21 — Tree density classes for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative C**

| Tree Density Class | Pre-Implementation | | Post-Implementation | | Difference |
|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | (Acres) |
| **Low** | 3356 | 9 | 3622 | 10 | + 266 |
| **Moderate** | 5548 | 15 | 8382 | 22 | + 2834 |
| **High** | 28662 | 76 | 25564 | 68 | – 3098 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres), and reflecting the direct/indirect effects of implementing Alternative C (affecting approximately 3754 acres of the Affected Environment). Refer to Martin (2010) and Powell (2010b) for information about the tree density classes and how they were derived.

Tree density HRV results are presented in Table 4-22.

For the Moist UF PVG, proposed activities resulted in the low density class increasing from 9 to 10%, which results in this class remaining outside the historical range; the moderate density class increased from 14 to 22%, both of which are below the historical range; and the high density class was reduced from 77 to 68%, remaining well above the historical range after Alternative implementation.

As expected, for the Dry UF PVG, proposed activities did not affect the low density class. For the moderate density class, proposed activities would move the class slightly outside the historical range (from 30 to 31%) as a result of conversions from the high density class, which would drop from 65 to 64%.

**Table 4-22 — HRV analysis of tree density classes for the entire forest vegetation Affected Environment, reflecting direct/indirect effects of implementing Alternative C**

| Tree Density Class | DRY UPLAND FOREST PVG | | | | MOIST UPLAND FOREST PVG | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Range | | Post-treatment | | Historical Range | | Post-treatment | |
| | Percent | Acres | Percent | Acres | Percent | Acres | Percent | Acres |
| Low | 40-85 | 630-1338 | 5 | 83 | 20-40 | 7143-14286 | 10 | 3486 |
| Moderate | 15-30 | 236-472 | 31 | 489 | 25-60 | 8929-21429 | 22 | 7791 |
| High | 5-15 | 79-236 | 64 | 1002 | 15-30 | 5357-10715 | 68 | 24439 |

*Sources/Notes:* Summarized from the Tollgate vegetation database (including the entire forest vegetation Affected Environment – approximately 37,566 acres, except for 277 acres of cold upland forest not included in this analysis), and reflecting the direct/indirect effects of implementing Alternative C (affecting approximately 3,900 acres of the Affected Environment). Gray shading indicates tree density classes that are above or below the historical range of variability. Historical ranges were taken from Schmitt and Powell (1998).

Why wouldn't implementation of the silvicultural activities associated with Alternatives C result in more of the forest structural stages moving within their historical ranges? This outcome is generally related to two factors:

1. A relatively low proportion of area (acreage) is being treated (Table 4-21), which limits the opportunity to change under- or over-represented forest vegetation types.
2. Proposed silvicultural activity units cannot generally address every issue simultaneously. Very few individual units address all three of the primary forest vegetation issue categories (composition, structure, density) simultaneously, so certain activity units directed toward a specific issue (such as composition) may have a neutral or negative effect on another issue (such as structure or density), depending on a unit's suitability for addressing issues and priority setting between units.

#### Risk/Susceptibility to windthrow, insect and disease disturbances / Slash Treatments

The activities proposed under Alternative C are qualitatively similar to those proposed under Alternative B such that a general assessment of direct and indirect effects on vegetation susceptibility to windthrow, insects and diseases can be found in the direct/indirect effects section for Alternative B. Similarly, slash treatment effects on vegetation species composition, density, and forest structure for activities described under Alternative C are described in the direct/indirect effects section for Alternative B. Differences between the two Alternatives over time do not exist. Differences over space are indicated in Maps A3 and A4.

### *Cumulative effects*

The activities proposed under Alternative C are similar to those proposed under Alternative B, such that an analysis of cumulative effects of implementing the activities proposed under Alternative C overlapping in space and time with the effects of other past, present, and reasonably foreseeable activities can be found by reviewing the cumulative effects section for Alternative B.

## Consistency Findings with Forest Plan and Other Laws and Regulations

### *Eastside Screens Forest Plan Amendment*

In March 1993, the Natural Resources Defense Council (NRDC) petitioned the U.S. Forest Service (Pacific Northwest Region) to halt all timber harvest activity in old growth forest occurring on national forest lands located east of the Cascade Mountain crest in Oregon and Washington (this geographical area is also known as the Eastside).

A month later in April 1993, a group of university and U.S. Forest Service research scientists released an "Eastside Forest Ecosystem Health Assessment" in draft form; this assessment is known as the "Everett Report" because it was directed by Dr. Richard Everett, a scientist located at the Wenatchee Forestry Sciences Laboratory (Everett et al. 1994).

In response to both the NRDC petition and the Everett report, the Pacific Northwest Region of the U.S. Forest Service issued interim direction in August 1993 requiring that timber sales prepared and offered by Eastside national forests be evaluated to determine their potential impact on riparian habitat, historical vegetation patterns, and wildlife fragmentation and connectivity.

This interim direction, known as the Eastside Screens, was used to amend Eastside forest plans when Regional Forester John Lowe signed a Decision Notice on May 20, 1994 to implement Regional Forester's Forest Plan Amendment #1 (USDA Forest Service 1994). Regional Forester's Forest Plan Amendment #1 is amendment #8 to the Umatilla National Forest Land and Resource Management Plan.

A slightly revised version of the Eastside Screens was issued as Regional Forester's Forest Plan Amendment #2 when Regional Forester John Lowe signed a Decision Notice on June 12, 1995 (USDA Forest Service 1995). Regional Forester's Forest Plan Amendment #2 is amendment #11 to the Umatilla National Forest Land and Resource Management Plan.

The Eastside Screens consist of six items: three general items (items 1 to 3), a riparian standard (item 4), an ecosystem standard (item 5), and a wildlife standard (item 6). This section describes how proposed silvicultural activities for the Tollgate Vegetation Management Project would comply with the Eastside Screens.

### General Standards (items 1-3 in FP Amendment #11)

Item 1 defines the scope of the Eastside Screens to be timber sales only.

**Finding:** The Proposed Action includes intermediate harvest silvicultural activities. In some portions of the planning area, these activities would be implemented using a commercial timber sale contract. Since item 1 defines the scope of the Eastside Screens to be timber sales only, and because a timber sale contract would be used to implement some of the silvicultural activities, this means that the Tollgate Vegetation Management Project must comply with the Eastside Screens.

Item 2 exempts personal-use firewood sales, post and pole sales, sales to protect health and safety, and sales within recreation special use areas from the amendment.

**Finding:** It is not anticipated that personal-use firewood sales, post and pole sales, sales to protect health and safety, or sales within recreation special use areas would be used to implement any of the thinning or regeneration cutting silvicultural activities, so item 2 does not apply to the Tollgate Vegetation Management Project.

Item 3 exempts five categories of timber sales from the ecosystem standard (but not from the riparian and wildlife standards):

- Precommercial thinning;
- Material sold as fiber;
- Dead material less than 7 inches in diameter, with incidental green volume;
- Salvage sales located outside mapped old growth, with incidental green volume; and
- Commercial thinning and understory removal sales located outside mapped old growth.

**Finding:** Both of the intermediate silvicultural activities (improvement cutting and low thinning) qualify for an exemption from the ecosystem standard because they are "commercial thinning and understory removal sales located outside mapped old growth" (the fifth category of timber sales included in item 3).

"Mapped old growth" is defined to include both of the Forest Plan allocations for old growth (C1 and C2) and as depicted on published maps distributed with the Forest Plan (USDA Forest Service 1990), as amended. This definition for mapped old growth follows written guidance and direction from the Pacific Northwest Region "Eastside Screens Oversight Team" (Lowe 1995).

However, direction from the Pacific Northwest Regional Office states that it is not mandatory to exempt "commercial thinning and understory removal sales" from the ecosystem standard and it further notes that in some circumstances, it may be advantageous to project viability to not exempt them (Lowe 1995).

The intermediate silvicultural activities described in the Proposed Action (improvement cutting, low thinning) are contained in the land base used for the historical range of variability (HRV) analysis for the Tollgate Vegetation Management Project, so there is no need to exempt them from the ecosystem standard, *and an exemption is not claimed*.

### *Riparian Standard (item 4 in Forest Plan Amendment #11)*

Item 4 of the Eastside Screens directs that timber sales (green and salvage) will not be planned or located in riparian areas.

Umatilla National Forest policy is that amendment #10 (USDA Forest Service and USDI Bureau of Land Management 1994) to the Land and Resource Management Plan would be applied in lieu of the riparian standard from the Eastside Screens.

Forest Plan amendment #10, commonly referred to as Pacfish, is interim direction designed to "arrest the degradation and begin the restoration of aquatic habitat and riparian areas on lands administered by the Forest Service and BLM; it applies to watersheds outside the range of the northern spotted owl that provide habitat for Pacific salmon, steelhead, and sea-run cutthroat trout." *This policy means that applying* Pacfish *also meets the Eastside Screens riparian standard*.

Pacfish uses a buffer concept to establish riparian habitat conservation areas (RHCA) along both sides of streams, rivers, lakes and other wetlands. RHCA widths extend from the edge of the active stream channel and they vary with stream class and whether a stream is fish bearing or not. RHCAs can be established using specified feet of slope distance (such as 300 feet on either side of perennial, fish-bearing streams) or in numbers of "site potential tree heights" (such as 2 site-potential tree heights for perennial, fish-bearing streams). The interim RHCA widths established by the Pacfish environmental assessment could be adjusted during watershed analysis or after site-specific analysis presenting a rationale for RHCA modifications.

Timber harvest activities are prohibited by the Pacfish amendment except in the following situations (see timber management standards, page C-9, in USDA Forest Service and USDI Bureau of Land Management 1994):

5. For catastrophic events such as fire, flooding, volcanic, wind or insect damage (when salvage harvest and fuelwood cutting is then allowed if compatible with riparian management objectives); and
6. When applying silvicultural practices to control stocking, reestablish and culture stands, and acquire desired vegetation characteristics in a manner that also meets riparian management objectives.

**Finding:** None of the proposed silvicultural activities would occur in any of the riparian habitat conservation areas established by Pacfish (FP amendment #10) not covered by exception authorities under item #2 above, and/or a Forest Plan amendment. The project would include a site specific Forest Plan amendment for the fuels treatments within RHCA of units 19, 38, 66, and 75 (unit 19 only, under Alternative C), described in Appendix B. The amendment would modify applicable Pacfish standards and guides regarding treatment within RHCAs. The amendment is site specific to the Tollgate Fuels Reduction project and would remain valid only during implementation of this project. The intention of the treatment is to control stocking by reducing stand density to within management zones recommended by Powell (1999, 2009c), and would result in desirable vegetation characteristics because post-treatment stands would be relatively resistant to passive or active crown fire, as described in the fire and fuels specialist report in the Tollgate Fuels Reduction project record. The desired vegetation characteristics would also meet riparian management objectives by reducing future wildfire intensity and severity (references), maintaining high levels of canopy cover and stream shade, and maintain moderate to high levels of woody structure to maintain hydrologic form and function (refer to the hydrology and fisheries reports in the Tollgate Fuels Reduction project record for a description of sufficient riparian canopy cover and woody debris/structure)

### *Ecosystem Standard (item 5 in Forest Plan Amendment #11)*

The ecosystem standard requires a landscape-level assessment of the historical range of variability (HRV) for structural stages, including a comparison of existing structural stage amounts with their historical ranges.

Item 5 (a) requires that the Forest Service "characterize the proposed timber sale and its associated watershed for patterns of stand structure by biophysical environment and compare to the Historic Range of Variability (HRV)."

Item 5 (c) requires that the Forest Service "characterize the difference in percent composition of structural stages between HRV and current conditions."

**Finding:** Structural stages for the planning area were determined and then compared with their historical ranges (e.g., HRV) by biophysical environment. Results of the analysis results are included in Table 3-24.

Item 5(b) requires that the Forest Service (1) "describe the dominant historical disturbance regime, i.e. the disturbance types and their magnitudes and frequencies. (2) Characterize the landscape pattern and abundance of structural stages maintained by the disturbance regime. Consider biophysical environmental setting across the landscape to make this determination. (3) Describe spatial pattern and distribution of structural stages under the HRV disturbance regime, and (4) Map the current pattern of structural stages and calculate their abundance by biophysical environmental setting" (USDA Forest Service 1995).

**Finding:** The analyses and map required by item 5(b) above are included within this analysis as follows:

- 5(b)(1): Table F2 and associated references
- 5(b)(2) and (3): Table 3-24 and F6a-c, and associated references
- 5(b)(4): Figure F1 in Appendix F and Figure 4-2 here, as well as Table 3-24, and F6a-c, and associated references

Item 5 (c) also requires that the Forest Service "identify structural conditions and biophysical environment combinations that are outside HRV conditions to determine potential treatment areas" (USDA Forest Service 1995).

**Finding:** Results from the structural stage HRV analysis were used when determining potential treatment areas for the Tollgate Vegetation Management Project. However, HRV analyses were also completed for species composition and tree density in addition to structural stages, so potential treatment areas may reflect HRV results for more than one of these indicators: species composition, structural stage, and tree density.

### *Wildlife Standard (item 6 in Forest Plan Amendment #11)*

Item 6 (a) states that the wildlife standard has two possible scenarios to follow as based on HRV results for late-old structural stages (LOS), and it defines LOS to be the "multi-stratum with large trees" and "single stratum with large trees" structural stages.

Item 6 (b) directs that:

1. **1.** Scenario A (item 6 d) is to be used whenever either one of the LOS stages is below HRV. If both LOS stages occur within a single biophysical environment and one is above HRV and one below, scenario A is to be used.
2. **2.** Scenario B (item 6 e) is to be used only when both LOS stages for a particular biophysical environment are within or above HRV.

   **Finding:** Tables F6a-b in Appendix A show that both LOS stages are within or above HRV for both dry and the moist upland forest biophysical environments. According to item 6 (b) of the wildlife standard and the HRV results presented in Appendix Tables F6a-b, this means that **forest vegetation silvicultural activities for the Tollgate Vegetation Management Project must comply with Scenario B** for the Dry and Moist Upland Forest biophysical environments.

When performing analysis of vegetation Historic Ranges of Variability (HRVs), existing vegetation was stratified into PVGs (Martin 2010). Since the cold upland forest PVG included less than 1,000 acres within the Tollgate planning area, it was largely excluded during HRV analysis because a full complement of cover types, structural stages, or tree density classes would not be expected for such a small amount of acreage (Martin 2010 and Powell 2010b).

Item 6(e), which is scenario B of the wildlife standard, has the four requirements described below. Since the Dry and Moist Upland Forest biophysical environments must comply with Scenario B, all findings will be reported in the context of these biophysical environments.

1. Item 1 of scenario B establishes a priority for timber harvest activities, ranging from non-LOS stands (first priority) to smaller, isolated LOS stands (second priority) and finally to the interior of large LOS stands as a third priority (large LOS is defined as stands occupying 100 acres or more). Regeneration and group selection treatments are not allowed in the interior of large LOS stands (item 6(e)(1)(c)).

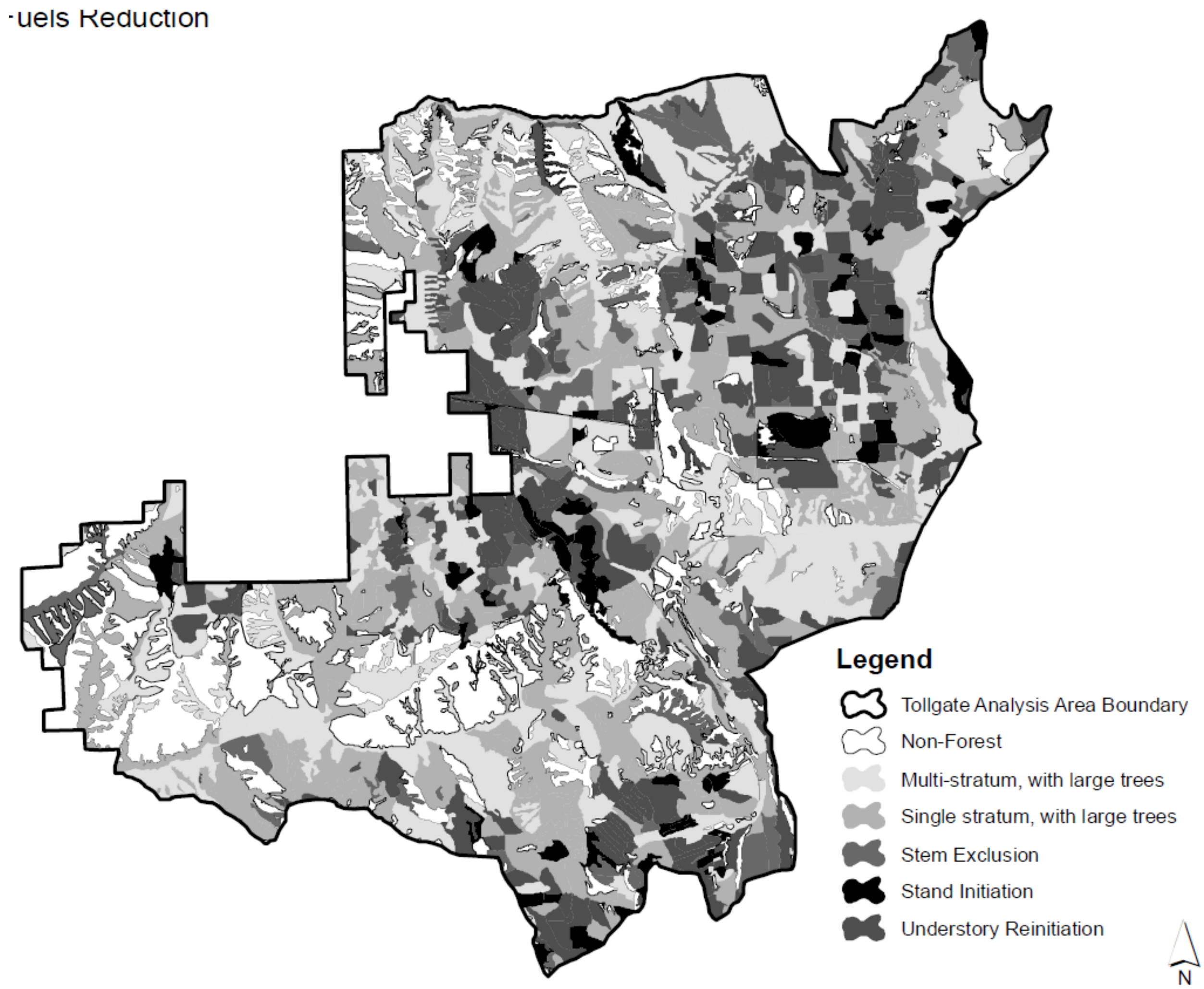


**Figure 4-2 — Map depicting the current pattern of structural stages for the entire Tollgate Project Planning Area (app. 37,566 acres).** [25]

**Finding:** The underlying assumption of this item is that if timber sale activities were allowed to occur within LOS stands, they could cause significant reduction in LOS suitability, particularly if the silvicultural activities being applied involved regeneration cutting methods.

Also, all silvicultural activity proposed for LOS stands involves intermediate (non-regeneration) silvicultural activities that would maintain LOS characteristics after treatment. Since intermediate harvest is the only harvest activity proposed for LOS stands, regardless of which biophysical environment activities occur in or which of the wildlife screen scenarios they fall under, there is no regeneration cutting proposed (including group selection) for any portion of the LOS stands, including their interiors.

[25] Structural stage names in the map legend correspond to the Eastside Screens names (see Table 9), and are synonymous with the old forest names or acronyms used for structural stages elsewhere in this report.

2. Item 2 of scenario B requires that connectivity be maintained between LOS stands and Forest Plan-designated old-growth areas, and that fragmentation of existing LOS stands be avoided by limiting silvicultural treatments to non-regeneration and single-tree selection prescriptions (this requirement is derived from item 6(d)(3) of scenario A).

   **Finding:** Because only intermediate thinning treatments are included under Alternatives B and C (see Description of Alternatives section), connectivity would be maintained between LOS stands and Forest Plan-designated old-growth areas, and that fragmentation of existing LOS stands would be avoided by limiting silvicultural treatments to non-regeneration and single-tree selection prescriptions.

3. Item 3 of scenario B is a non-fragmentation standard that limits silvicultural treatments within the interior of large LOS stands to "non-fragmenting prescriptions such as thinning, single-tree selection (UEAM), salvage, understory removal, and other non-regeneration activities." Group selection is allowed when openings mimic the natural forest pattern and do not exceed ½ acre in size.

   **Finding**: As described above for item 1, all silvicultural activity proposed for LOS stands involves improvement cutting, an intermediate silvicultural activity (and a "non-fragmenting prescription") that would maintain LOS characteristics after treatment. Since improvement cutting is the only activity proposed for LOS stands, regardless of the biophysical environment in which it occurs or which of the wildlife screen scenarios under which it falls, there are no proposals to use group selection or other regeneration cutting methods for LOS stands.

4. Item 4 of scenario B requires that the snag, green-tree replacement, and down log standards from scenario A be followed (this is item 6(d)(4)(a) of scenario A), and that the goshawk standards from scenario A also be met (this is item 6(d)(4)(b) of scenario A), although item 4 does modify certain aspects of the post-fledging goshawk requirement from scenario A.

   **Finding:** The project's design features and management requirements stipulate that snags and replacement tree numbers would meet or exceed Forest Plan standards. For specific details about the snags, replacement trees, and down logs items, see the wildlife specialist report. According to the wildlife specialist report, there are no known goshawk nests in the Tollgate planning area. If a nest is discovered during project preparation or implementation, most-suitable nesting habitat and post-fledging area standards from portion 6(d) of the Wildlife Standard would be applied at that time.

### *National Forest Management Act of 1976 (NFMA)*

The National Forest Management Act (NFMA; Public Law 94-588; 16 U.S.C. 1600) requires specific findings to be made and documented when considering the implementation of certain management practices. The following is documentation of specific NFMA compliance findings for proposed silvicultural activities in the Tollgate planning area. Based on the analyses described in this report, and on proposed silvicultural prescriptions for the Tollgate project, the following findings pursuant to NFMA are made:

**Finding:** As described in the Description of Alternatives section and Appendix B of this report, silvicultural activities proposed for implementation during the Tollgate project are fully consistent with the Umatilla National Forest Land and Resource Management Plan (Forest Plan), as amended, and all of its relevant Forest Plan components (standards, guidelines, objectives, desired future conditions, etc.).

**Finding:** Selection of a silvicultural system (even-aged or uneven-aged cutting methods, including intermediate activities) was guided by eight criteria provided in a "Silvicultural Systems Selection" section of the Forest Plan (USDA Forest Service 1990, pages 4-66 and 4-67).

## Suitability

**Finding:** As described in the Affected Environment section of this report, all silvicultural activities would be implemented only on lands meeting the definition of forest land (16 U.S.C. 1604) and designated as suitable for timber production by the Forest Plan (USDA Forest Service 1990), as amended (including the 1994 Pacfish amendment to the Forest Plan establishing Riparian Habitat Conservation Areas, which are unsuitable for timber production), or implemented on unsuitable lands (riparian areas) under authorities granted by timber management standards, page C-9, in USDA Forest Service and USDI Bureau of Land Management (1994), or by a site-specific Forest Plan Amendment.

## Appropriateness of Even-aged Management

**Finding:** All proposed even-aged management is considered an appropriate method to achieve the identified objectives and other Forest Plan components such as desired future conditions. All stands where regeneration harvests is prescribed under an even-aged management regime (there are none for the Tollgate fuels reduction project) have generally reached culmination of mean annual increment.

## Optimality of Clearcutting

**Finding:** Clearcutting is not included among the activities proposed under the action Alternatives of the Tollgate Fuels Reduction project.

## Vegetation Manipulation

**Finding:** Tree stand manipulation complies with requirements found in 16 U.S.C. 1604:

1. The proposed silvicultural activities are well suited to the multiple-use goals and objectives established for the Tollgate Project Planning Area when considering the potential environmental impacts associated with their implementation.
2. There is ample assurance that lands proposed for regeneration cutting (created openings in the context of the Forest Plan) would be adequately restocked within five years after final harvest (there are no such proposed lands for the Tollgate fuels reduction project).
3. The proposed silvicultural prescriptions were not chosen primarily because they would give the greatest dollar return or the greatest output of timber, although these factors were considered when evaluating whether a proposed silvicultural activity was economically feasible.
4. The potential implementation effects on residual trees and adjacent stands were considered when developing the silvicultural proposals.
5. No permanent (e.g., irreversible) impairment of site productivity is expected as a result of the proposed silvicultural activities, and the project's design features and management requirements ensure conservation of soil, slope, and other watershed conditions.
6. As described in this report, Riparian Habitat Conservation Areas (RHCAs) would be specifically designated on the ground in such a way as to exclude their full extent from any adjacent upland forest area selected for silvicultural treatment, or from activities not permitted under authorities granted by timber management standards, page C-9, in USDA Forest Service and USDI Bureau

of Land Management (1994). The provision of RHCAs is deemed to be a sufficient and appropriate measure for protecting streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from potentially adverse project effects on water conditions or fish habitat (16 U.S.C. 1604(E)(iii)).

7. The proposed silvicultural activities are expected to provide desired effects with respect to water quantity and quality, wildlife and fish habitat, regeneration of desirable tree species, forage production, recreation uses, aesthetic values, and other resource yields.
8. The proposed silvicultural prescriptions are considered practical in terms of transportation and harvesting requirements, and total financial costs of project preparation, timber harvest, and sale administration.

## Climate Change and carbon cycling

The context of this climate change and carbon cycle analysis is that the Tollgate Fuels Reduction project planning area is too small for a direct evaluation of potential climate change effects caused by the proposed actions. Current understanding of climate science suggests it is difficult, if not impossible, to establish a cause-and-effect relationship between silvicultural activities and climate change **at a project scale**. Therefore, climate change and carbon cycling were not used or evaluated as issues during the NEPA process, and no indicators were established for comparing climate change or carbon cycle effects between Alternatives. At the same time, large and increasing levels of interest among the general public in how large forest management projects interact with climate change and carbon cycling nonetheless suggest there is some value in disclosure of existing understanding, particularly to identify key areas of uncertainty and demonstrate consistency with national and international strategies and objectives. To that end, a science overview is provided in this section.

The Proposed Actions under Alternatives B and C would affect National Forest System lands by implementing improvement cutting and low thinning silvicultural activities. The scope of the Proposed Action is minor relative to the planning area because silvicultural activities are proposed for less than 10% of the total planning area acreage (Map A2). A project of this magnitude would contribute such minimal amounts of greenhouse gas that its impact on global or national climate change would be infinitesimal. Therefore, the Proposed Action’s direct and indirect contribution to greenhouse gasses and climate change would be utterly negligible in the context of long-term climate patterns. In addition, because the direct and indirect effects would be negligible, the Proposed Action’s contribution to Cumulative Effects on greenhouse gasses and climate change would also be negligible. The minor scope of the Proposed Action suggests it would be inappropriate to attempt to isolate climate change effects that are directly or indirectly attributable to implementation of the Tollgate project.

The Intergovernmental Panel on Climate Change (IPCC) has summarized the contributions to climate change of global human activity sectors in its Fourth Assessment Report (IPCC 2007). The top three anthropogenic (human-caused) contributors to greenhouse gas emissions (from 1970-2004) are: fossil fuel combustion (56.6% of global total), deforestation (17.3%), and agriculture/waste/energy (14.3%). IPCC subdivides the deforestation category into land use conversions, and large scale deforestation.

Deforestation is defined as removal of all trees, most notably the conversion of forest and grassland into agricultural land or developed landscapes (IPCC 2000). The Tollgate Fuels Reduction project does not fall within any of these main contributors of greenhouse gas emissions. Forested land would not be converted into a developed or agricultural condition. In fact, forest stands are being retained and enhanced to maintain a vigorous forested condition that can continue to support trees and sequester carbon long-term.

The 2007 IPCC report also summarizes recommended sector-specific key mitigation "technologies and practices". For the forestry sector, those available include afforestation, reforestation, forest management, reduced deforestation, harvested wood product management, and use of forestry products for bioenergy to replace fossil fuel use. The Tollgate Fuels Reduction project is consistent with these recommendations because it proposes management of the forest for resistance to disturbance and resiliency in the face of changing disturbances and disturbance regimes. Depending on market factors, some of the products may be used to produce bioenergy and potentially replace fossil fuel use. Land-use changes, specifically deforestation and regrowth, are by far the biggest factors on a global scale in forests' role as sources or sinks of carbon dioxide, respectively (IPCC, Intergovernmental Panel on Climate Change 2000).

### *Compatibility with climate change mitigation and adaptation*

Two general strategies are used to address climate change: mitigation and adaptation. Mitigation involves reducing greenhouse gas emissions now in order to minimize the current pace and magnitude of climate change. Adaptation accepts that climate change will occur (and already is occurring), so it involves making ecosystems more resistant and resilient to the predicted effects of future climate fluctuations.

The silvicultural activities included in the Tollgate proposed action are considered to be compatible with a mitigation strategy (Baron et al. 2008, Nabuurs et al. 2007, Reyer et al. 2009, Salinger et al. 2005) – intermediate cutting (thinning and improvement cutting) contributes to a "maintain forest area" mitigation objective (i.e., ensure that lands currently supporting forest continue to support forest in the future) (Nabuurs et al. 2007).

While mitigation is crucial, adaptation to climate change is increasingly viewed as a necessary and complementary strategy to mitigation (Joyce et al. 2009). Table 4-23 — Compatibility of silvicultural activities and climate change adaptation strategies includes a list of adaptation strategies proposed for the National Forest System as a whole, and pertaining to forest vegetation (these are shown in the left column). Certain principles and concepts of climate change, however, can be used to assess whether silvicultural activities included in the Tollgate proposed action would be expected to maintain or enhance forest adaptation to the predicted effects of climate change. Table 4-23 — Compatibility of silvicultural activities and climate change adaptation strategies also describes how silvicultural activities included in the Tollgate proposed action could be compatible with the adaptation strategies (shown in right column). Silvicultural proposed actions are expected to improve the "adaptive capacity" (Olsson et al. 2004) of forest stands in the Tollgate planning area, particularly by alleviating the chronic stress associated with high tree density levels. Improvements in adaptive capacity are important for helping forest vegetation deal with the direct effects of warming temperatures and reduced precipitation, as well as the indirect effects caused by climate-influenced disturbance processes.

The Intergovernmental Panel on Climate Change (IPCC) concluded with high confidence (8 out of 10 chance) that "disturbances such as wildfire and insect outbreaks are increasing and are likely to intensify in a warmer future with drier soils and longer growing seasons, and to interact with changing land use and development affecting the future of wildland ecosystems" (Parry et al. 2007, page 56). This IPCC conclusion demonstrates that climate change involves more than just the direct effects of warming temperatures and variable precipitation – it includes the indirect effects of climate change on wildfire, insect outbreaks, and other biotic and abiotic disturbance processes.

The information in Table 4-23 — Compatibility of silvicultural activities and climate change adaptation strategies indicates that silvicultural activities addressing stand vulnerability to uncharacteristic levels of wildfire, along with other climate-related changes in disturbance regimes, could meet multiple goals of near-term mitigation and mid-term adaptation even as practices also reflect goals for other ecosystem services such as late-old structure and water quality (Joyce et al. 2009).

**Table 4-23 — Compatibility of silvicultural activities and climate change adaptation strategies**

| Climate Change Adaptation Strategies That Are Related to Forest Vegetation | Predicted Compatibility of Strategy with Tollgate Proposed Silvicultural Activities |
|---|---|
| Improve the capability of ecosystems to withstand uncharacteristically severe drought, wildfires and insect outbreaks at landscape scales. | Rationale for the silvicultural activity proposals is based largely on insect and disease susceptibility and the potential to reduce wildfire intensity and severity, particularly for dry-forest sites. |
| Facilitate natural (evolutionary) adaptation through silvicultural activities that shorten regeneration times and promote interspecific competition. | The activities proposed under Alternatives A, B, and C would have no appreciable facilitation effect on natural (evoluationary) adaptation through silvicultural activities that shorten regeneration times and promote interspecific competition. Therefore, the activities are neither compatible nor incompatible with this adaptation strategy. |
| Where ecosystems will very likely become more water limited, manage for drought- and heat-tolerant species. | Specifications for how the silvicultural activities would be implemented account for species-specific life history traits influencing drought and heat resistance. Drought-tolerant species are preferentially retained during intermediate cutting. |
| Reduce homogeneity of stand structure and synchrony of disturbance patterns across broad landscapes by promoting diverse age classes and species mixes, stand diversities, and genetic diversity. | The activities proposed under Alternatives B, and C would promote more diverse age classes and species mixes, stand diversities, and genetic diversity. |
| Reset ecological trajectories to take advantage of early successional stages that are adaptive to present rather than past climates. | Where possible, intermediate activities will favor early seral species, particularly those that are more suited for warmer, drier climates. |
| Use historical ecological information to identify environments buffered against climate change and which would be good candidates for conservation. | Low and moderate-density structures dominated by early-seral tree species are likely to be more resilient to predicted climate change. Proposed silvicultural activities are directed toward conserving these structures and early-seral tree species where they currently exist, or restoring them if important biological legacies (such as large trees) are still present. Thinning will increase heterogeneity and create resilient tree density levels on all biophysical environments. |
| Encourage local industries that can adapt to or cope with variable types of forest products because of the uncertainty about which tree species will prosper in the future. | It is anticipated that some portion of the silvicultural activity involving timber harvest (intermediate and regeneration cutting) would be accomplished using stewardship authority or another Alternative that would not involve a standard timber-sale contract. Local stewardship or biofuel/bioenergy industries are capable of dealing with unconventional species or product types. |
| Reforestation after disturbance may require different species than were present before the disturbance to better match site-level changes | No reforestation activities are proposed under Alternatives A, B, or C. |

| Climate Change Adaptation Strategies That Are Related to Forest Vegetation | Predicted Compatibility of Strategy with Tollgate Proposed Silvicultural Activities |
|---|---|
| associated with climate change. | |
| Plan for higher-elevation insect outbreaks, species mortality events, and altered fire regimes. | The silvicultural activities proposed for implementation on moist-forest sites anticipate accelerated mortality of subalpine fir (which is currently occurring at high levels due to an infestation of balsam woolly adelgid, an introduced, non-native insect species), Engelmann spruce, and other species that are predicted to not fare well under future climate conditions (Rehfeldt et al. 2006). |

*Sources/Notes*: the climate change adaptation strategies pertain to forest vegetation only and were derived from Joyce et al. (2008, 2009) and West et al. (2009). The predicted compatibility of each adaptation strategy with silvicultural activities included in the Tollgate proposed action was provided by the author of this specialist report.

Forest managers will need options to choose from, even as they face uncertainty of future climate conditions in their regions. Although no single adaptation approach will fit all forest regions, in general, practices focused on forestalling climate change effects by building resistance and resilience into current ecosystems, and on managing for change by enabling plants, animals, and ecosystems to adapt to climate change. Better and more widespread implementation of already known practices that reduce the impact of existing stressors represents a strategy that can be used even while uncertainty about future conditions is high. Increased emphasis on current efforts to reduce the impact of existing stressors on National Forests represents a ‘‘no regrets’’ strategy. Efforts to mitigate existing stressors would address current management needs, and potentially reduce future interactions of these stressors with climate change. (Joyce et al. 2009).

There is consensus that future forests will be different from those of the past, but different climate models result in a wide variety of possible outcomes, particularly at a local or regional scale. Such models cannot predict future conditions with the level of accuracy and precision needed for resource managers to make some management changes with certainty (Millar et al. 2007, Ryan et al. 2008).Many climate change scenarios include an increase in winter precipitation but increased temperatures and increased frequency of summer drought, which may result in more moisture stress in forest environments (Spittlehouse and Stewart 2003). This may cause reduced growth and decreased vigor of forest stands. Declines in vigor may make forests more susceptible to large-scale pest attacks and more frequent or severe fires. Existing plant species or genotypes may be poorly adapted to future climate conditions. Being relatively long-lived, the forest trees living today will probably compose much of the forests of the next century. Long-term adaptation to climate changes will require healthy and productive forests in the short term (Millar et al. 2007) and silvicultural systems will need to increasingly take into account unique characteristics associated with declining and disturbed stands (Spittlehouse and Stewart 2003). Efforts to mitigate existing stressors would address current management needs, while potentially reducing future interactions of these stressors with climate change (Joyce et al. 2009).

Intermediate cutting silvicultural activities are included in the Tollgate proposed action, and have considerable relevance to predicted changes in future temperature and precipitation for a large region containing the Tollgate planning area. Climate modeling suggests that drought conditions will be more common in the future because mid-summer temperatures are expected to be substantially higher than at present. Dense tree stands exist in a sort of perpetual physiological drought because there is not enough soil moisture to meet the water needs of all trees; intermediate cutting is used to alleviate this moisture stress and allow the residual trees to survive and continue growing.

It is expected that future climate conditions would have demonstrably more impact on dense stands than is produced by the current climate. Therefore, the need for thinning and related intermediate activities is expected to be much greater in the future than at present because thinning improves physiological vigor, and trees with improved vigor produce more of the resins used to repel insect and disease attacks (Kolb et al. 1998, Mitchell et al. 1983, Pitman et al. 1982, Safranyik et al. 1998). Thinning also disrupts canopy fuel continuity, which could help address future crown-fire risk (Agee 1996, Powell 2010a, Scott 1998).

Insect outbreaks and wildfire are both predicted to occur at significantly higher levels in a warmer and dryer future than at present (Canadell and Raupach 2008, Kurz et al. 2008a, Westerling et al. 2006). Thus, in light of predicted temperature and precipitation changes at a regional scale (the Pacific Northwest), the silvicultural activities included in the Proposed Action adequately anticipate future climate change, appropriately provide for future ecosystem resiliency and integrity, and reasonably realign existing conditions to be more sustainable under future climate conditions (Dale et al. 2001).

Adaptive management is essential to managing for uncertainty. Although general principles will emerge, the best preparation is for managers and planners to remain informed both about emerging climate science as well as land-use changes in their region, and to use that knowledge to shape effective local solutions (Millar et al. 2007). Adaptive management can make use of new information, and this information may be useful for adjusting desired conditions and guidelines in the future.

### *Climate Change and HRV*

The historical range of variability (HRV) is defined as the range of conditions and processes likely to have occurred prior to settlement by Euro-American emigrants (Landres et al. 1999). HRV is an analytical process for evaluating inherent variation in vegetation composition, structure, and density, reflecting recent evolutionary history and the dynamic interplay of biotic and abiotic factors (Morgan et al. 1994). In the context of forest vegetation analyses for the Tollgate area, HRV was used extensively when evaluating the environmental effects of implementing alternatives (see previous sections of this chapter). HRV was used as a tool to help us understand present forests and why they respond as they do when exposed to silvicultural activities – it uses the past to help us understand the present, to understand which forces affect vegetation response, to gain insight into possible trajectories of future forests, and to integrate this information when proposing management alternatives (Millar and Woolfenden 1999).

“Some feel that HRV may no longer be a viable concept for managing lands in the future because of expected climate warming and increasing human activities across the landscape. Today’s climates might change so rapidly and dramatically that future climates will no longer be similar to those climates that created past conditions. Climate warming is expected to trigger major changes in disturbance processes, plant and animal species dynamics, and hydrological responses to create new plant communities and alter landscapes that may be quite different from historical analogs” (Keane et al. 2009, pages 1033-1034).

“At first glance, it may seem obvious that using historical references may no longer be reasonable in this rapidly changing world. However, a critical evaluation of possible alternatives may indicate that HRV, with all its faults and limitations, might be the most viable approach for the near-term because it has the least amount of uncertainty” (Keane et al. 2009, page 1034), particularly as compared to the uncertainty associated with the magnitude, timing, scale, and spatial extent of climate change impacts.

“Given the uncertainties in predicting climatic responses to increasing $CO_2$ and the ecological effects of this response, we feel that HRV time series derived from the past may have significantly lower uncertainty than any simulated predictions for the future. We suggest it may be prudent to wait until simulation technology has improved to include credible pattern and process interactions with regional climate dynamics and there has been significant model validation before we throw out the concept and application of HRV” (Keane et al. 2009, page 1034).

"In the meantime, it is doubtful that the use of HRV to guide management efforts will result in inappropriate activities considering the large genetic variation in most species and the robustness inherent in regional landscapes that display the broad range of conditions inherent in HRV projections" (Keane et al. 2009, page 1034).

## *Carbon cycling*

Increasingly, land managers are being asked to consider the potential carbon consequences of forest management activities. This section discusses issues associated with carbon storage and sequestration, carbon stocks and fluxes, and possible interactions between activities that would be expected to cause short-term reductions in carbon stocks (such as thinning and prescribed fire) in order to avoid potentially large carbon emissions from wildfire and other stand-replacing disturbance processes in the future.

Increased burning of fossil fuels (coal, oil and its refined products including gasoline, and natural gas) since the beginning of the Industrial Revolution has resulted in increased levels of carbon dioxide ($CO_2$) in the atmosphere. As $CO_2$, methane and other greenhouse gases accumulate, they contribute to a host of changes referred to as the greenhouse effect, global warming, or climate change.

Terrestrial carbon (C) sequestration involves processes through which $CO_2$ from the atmosphere is absorbed by trees, plants and crops through photosynthesis, and then stored as C in biomass (tree trunks, branches, foliage, and roots) and in soils. The term "sink" is also used to refer to forests, croplands, and rangelands and their ability to sequester C. Since agriculture and forestry activities can also release $CO_2$ to the atmosphere, a C sink occurs when carbon sequestration is greater than carbon release over a given time period. When more $CO_2$ is being released than sequestered, an activity or condition is considered to be a C source in contrast to a C sink (Fahey et al. 2009). Hudiburg found that the potential to store additional carbon in Pacific Northwest forests is among the highest in the world (Hudiburg et al. 2009). However, these levels (if reached) may be unstable in high-frequency fire regions, a factor that the study did not include in their calculations.

Because old forests steadily accumulate biomass for centuries, they contain large amounts of C and function as a C sink (Rhemtulla et al. 2009). But the cumulative probability of disturbance is higher for stands with high aboveground biomass, so old forests tend to be less common than young or mid-age stands, even in unmanaged landscapes (Lesica 1996, Luyssaert et al. 2008).

Forest ecosystems are an important part of the global C cycle since they are estimated to sequester about 80 percent of the aboveground terrestrial C pool (Waring and Running 1998). For this reason, forests and their management are at the forefront of efforts and programs to address global climate change because they might provide one of the most efficient and effective options for offsetting $CO_2$ emissions from fossil-fuel consumption (Bonan 2008, Canadell and Raupach 2008, Salinger et al. 2005, Winnett 1998).

Wildfire and other disturbance processes (insect outbreaks, disease epidemics, windthrow episodes, avalanches and debris flows, etc.) can release a forest's stored C as $CO_2$ emissions, either directly by combusting the wood or indirectly by killing trees that are eventually decomposed by microbes, with $CO_2$ emissions being produced during microbial decomposition of standing or down dead wood.

Traditionally, it was believed that the main loss of C and other nutrients during a fire was in a gaseous form (as $CO_2$, $NO_2$, and $H_2O$), but recent research shows that much of the loss occurs as particulate matter carried in the smoke plume (Bormann et al. 2008). The surprisingly large loss of soil nutrients from fire not only contributes to greenhouse gas emissions, but the research suggests it will lower productivity and C sequestration rates for a substantial period after burning (Bormann et al. 2008).

Disturbance effects are often indirect – fire can change the albedo (absorption characteristics) of the soil surface, which then allows more solar energy to be absorbed and increased decomposition rates for decades into the future (Running 2008). Since a young forest might get established after fire and develop for 100-300 years, eventually recapturing an equivalent amount of C to what was released by the fire, forests can be "carbon-neutral" when evaluated across long timeframes. If climate change or other factors alter these post-fire successional relationships, however, it is possible that forests could disappear altogether following wildfire (Adams et al. 2009), in which case the system would obviously not be C neutral.

Other research indicates that fire causes accelerated decomposition rates after burning, perhaps related to soil warming from the albedo changes described above. Auclair and Carter (1993), for example, calculated that post-wildfire C release after a high-intensity fire, presumably related to microbial decomposition rates, was approximately three times greater than the direct release of $CO_2$ during the fire itself. In a drier ponderosa pine ecosystem, direct C flux measurements found higher $CO_2$ emissions from a high-intensity burn area than an adjacent unburned area, even ten years after the fire (Dore et al. 2008).

Fire and C relationships are complex because fire has an important influence on the vegetation baseline against which climate change and C effects are measured. Climate plays an important role in determining fire patterns (particularly regarding temporal trends in the El Nino-Southern Oscillation and Pacific Decadal Oscillation climate patterns) and, in turn, fire influences the climate system via the release of greenhouse gases. Fires influence the natural cycle of primary production and respiration, and if climate and fire regimes equilibrate, then fire-induced atmospheric $CO_2$ emissions are balanced over the long term by uptake from surviving vegetation or regeneration (Bond et al. 2005, Bowman et al. 2009, Kashian et al. 2006).

Forests in the United States sequester about 10 percent of the annual anthropogenic $CO_2$ emissions (Woodbury et al. 2007). Wildfires are increasing both in size and severity (Miller et al. 2009, Westerling et al. 2006) and they produce large direct $CO_2$ emissions on the order of 4-6% of annual U.S.

anthropogenic $CO_2$ emissions (Spracklen et al. 2007, Wiedinmyer and Neff 2007). As the amount of burned acreage increases, fire suppression costs routinely exceed $1 billion a year and this is causing managers to consider a policy where some fires would be allowed to burn when doing so would provide ecosystem benefits (such as Wildland Fire Use) and reduced suppression costs (Donovan and Brown 2005, 2007, 2008).

Since wildfires represent a substantial potential source of future $CO_2$ emissions, much of the recent forest management emphasis is directed at either reducing fire susceptibility or improving fire resistance (Sohngen and Haynes 1997). Mitchell et al. 2009 concluded that the application of fuel reduction activities may be essential for ecosystem restoration in forests with uncharacteristic levels of fuel build-up, as is often the case in xeric forest ecosystems east of the Cascades. One of the objectives of using mechanical thinning, prescribed fire, or a combination of both activities to reduce fuel loadings is to produce relatively small carbon releases now in an effort to preclude or minimize large $CO_2$ wildfire emissions in the future (Canadell and Raupach 2008). And climate change research suggests that the area burned by wildfire could increase 78 percent by 2100, with much of the increase due to a 44% increase in lightning ignitions (Price and Rind 1994).

A recent study found that significant increases in fire resistance can be achieved by removing only smaller ladder fuels (vegetation structure providing vertical fuel continuity between the forest floor and overstory tree crowns) and fire-sensitive intermediate trees without reducing the majority of the live-tree C pool associated with intermediate pines and large trees of all species. This study concluded that thinning and prescribed fire have a positive influence on forest development by redirecting tree growth resources and C storage into large-diameter trees, a more stable C stock, and large trees are more resistant to mortality and other potentially detrimental fire effects (Hurteau and North 2009, North et al. 2009).

Other research suggests that historic stands with a low density of large trees supported more biomass (and C) than contemporary, fully-stocked, fire-suppressed old growth forest (DeLuca and Aplet 2008). An explanation for this seemingly counterintuitive result is that on a proportional basis, one large tree has a higher C content than many small trees – according to Fellows and Goulden (2008), a single large tree (> 90 cm) contains the same amount of C as 60 small (10-30 cm) trees. Another explanation is that large trees mostly use deep soil water (≥ 70 cm), whereas small trees and shrubs rely on shallow soil water (< 50 cm) that is rapidly depleted during the growing season (Arkley 1981, North et al. 2009). A thick zone of weathered bedrock is particularly important for supplying the water needed by large trees on sites where the overlying soils are relatively thin (< 1 m), especially for summer-dry (Mediterranean) ecosystems (Witty et al. 2003).

Similar C emission concerns exist for disturbance processes other than wildfire – climate mitigation through forestry also carries the risk that C stocks may return to the atmosphere after disturbances such as landscape-scale insect outbreaks (Breshears et al. 2005, Carroll et al. 2004, Fleming and Volney 1995, Logan et al. 2003, Macias Fauria and Johnson 2009, Morehouse et al. 2008, van Mantgem et al. 2009, Williams and Liebhold 1995). A recent and dramatic increase in areas affected by mountain pine beetle and other bark beetles has helped drive Canadian forests from a $CO_2$ sink (before 2000) to a C source that is expected to continue for at least two or three more decades (Kurz et al. 2008a, 2008b).

Recent research could perhaps be interpreted as suggesting that an unintended benefit of the successional changes spawned by fire suppression is an increase in forest biomass (Myneni et al. 1997), and that this biomass has sequestered C that might otherwise have contributed to climate change (Fellows and Goulden 2008, Houghton et al. 2000, Hurtt et al. 2002). This interpretation is problematic in several respects, however, because fuel-loaded forests are susceptible to large carbon emissions when they eventually and inevitably burn in a stand-replacing wildfire (Hurteau et al. 2009).

All fuels and vegetation activities create C emissions to some extent, but overall C emissions can be reduced and future C stocks increased by modifying activities to reduce surface fuels, small understory trees, and intermediate-sized, fire-sensitive species (North et al. 2009). With proper fuels treatment activities that appropriately consider C stocks and fluxes, it is possible to create favorable forest conditions for increasing large-tree growth. This strategy is based on the concept that by accepting repeated but small reductions in C stocks (associated with the activities), it is possible to create or maintain a substantial future C sink by sequestering C in relatively stable, long-lived forest structure in the form of large-diameter trees (Hurteau et al. 2008, North et al. 2009).

The ecological rationale for a fuels treatment strategy on dry sites is that forests thinned to approach presettlement tree density and structure (as represented by HRV) contain substantially more C after wildfire than adjacent dense stands that have not been restored to a presettlement condition (Hurteau et al. 2008). And because the Umatilla National Forest has no explicit objective to manage forests for C sequestration purposes (USDA Forest Service 1990), perhaps the most important benefit of completing proper fuels treatment activities is restoration of late-old structure and associated ecosystem function (USDA Forest Service 1995), particularly for dry forests where the historical composition, structure, and density were maintained by a short-interval, low-severity fire regime (Mutch et al. 1993).

A life-cycle analysis for a second-growth forest in the Pacific Northwest indicates that allowing a harvested stand to grow and sequester C resulted in less emission of $CO_2$ than resulted from harvest and storage in wood products; however, when the effect of substituting wood for concrete and steel was also considered, then the harvest scenarios resulted in less $CO_2$ emission than were produced from the no-harvest scenario (Perez-Garcia et al. 2005). The option of using wood as a construction material in place of concrete or steel, or as an energy source to replace fossil fuels, has consistently been shown to offer significant C benefits (Eriksson et al. 2007, Gustavsson et al. 2006).

The overall C budget for both durable products and wood-based energy depends on fossil fuel use associated with harvest, transport, and processing. Houses constructed primarily of wood have 20-50% lower emissions of greenhouse gases over their entire life cycle (typically assumed to be 80-100 years) than comparable dwellings whose aboveground walls were framed with concrete or steel (Miner and Perez-Garcia 2007).

Using woody debris to produce energy has the potential to address two issues: (1) it reduces demand for coal, oil, natural gas and other fossil-fuel derivatives; and (2) if the wood comes from densely stocked, overgrown forests, its removal reduces the threat of wildfire and an associated emission of greenhouse gases (and wildfire typically emits more methane, a potent greenhouse gas, than would occur from a bioenergy facility).

An expected outcome of adopting either Alternative B or C of the Tollgate Fuels Reduction Project is provision of timber that could then be converted into durable wood products for house construction, or utilized as an energy source. Both of the project's proposed action alternatives (B and C) would respond to fire suppression effects and other forest vegetation issues (see Chapter 2) by using timber harvest and prescribed fire activities to remove varying amounts of woody biomass. Since about half the volume of woody biomass consists of C (Birdsey 1992, Jenkins et al. 2003, Smith et al. 2006), these activities are expected to reduce the amount of C stored in the treated stands. For the timber harvest proposals, a portion of the removed C would remain stored for a relatively long period of time in durable wood products, or in landfills.

Intermediate cutting would initially reduce C storage in the treated stands, but it is unclear whether the reductions would be substantial enough to transform the activity units from a net carbon sink to a net carbon source. Whether or not units are transformed into long-term sinks or sources of atmospheric carbon depends in part on future disturbance regimes, and the extent to which treated fuels are masticated on site and/or utilized for short-lived forest products (which could result in units being sources of atmospheric carbon) or long-term forest products, which could result in the units being carbon neutral or becoming atmospheric carbon sinks (Finkral and Evans 2008). The enhanced growth (carbon sequestration) by remaining trees also partially compensates for the decomposition of stumps, belowground roots, and harvest residues (Harmon and Marks 2002, Waring and Running 1998 and references therein). Given this, the expected overall balance of accelerated tree growth, harvest residues, and utilization for short and long-term forests products for the Tollgate Fuels Reduction project suggests that the expected effects of the activities proposed under Alternatives B or C are very unclear and dependent on a host of unpredictable variables such as future climate and disturbance regimes, the fate of converted forest products, belowground carbon cycling processes, and the extent to which forest products substitute other more carbon-intensive products such as fossil fuels, concrete, steel, etc.

# FUELS

## Alternative A – No Action Alternative

Fuel reduction activities are not proposed in this alternative. The effect of no action would be increasing accumulations of surface fuels resulting in greater fire intensities, greater potential for spotting, greater resistance to control, greater chance of sustained crown fire, and greater risk to fire suppression resources. This gradual increase over time would be due to disease, decadence, and natural events such as wind and insect infestation. Continued growth of the understory would increase the likelihood that ignitions that do occur would have the potential to transition from a surface fire to the forest overstory. Resistance to control under this alternative would be greater than alternatives in which fuels are treated. Heavy down fuels would contribute to increased fire intensities, spotting potential, receptive fuels for firebrands, and extreme fire behavior occurrence; all of which create potential unsafe firefighting conditions. Any fire start inside the project area or start outside and moving into the project area would likely be more expensive, difficult, and dangerous to suppress. The threat to private property, homes, public safety, and firefighter safety would be higher under the No Action alternative.

# Alternatives B and C

## *Direct and Indirect Effects*

### Crown Fire Potential

Proposed commercial harvest and subsequent fuels activities would reduce the crown fire potential by decreasing stem and crown densities and reducing surface fuel loadings. Ladder fuels are reduced through timber harvest and slashing (non-commercial thinning). Table 4-24 shows the crown fire potential before and after harvest activities are completed.

**Table 4-24 — Crown Fire Potential in the Tollgate Project Area**

| Existing | | After Harvest Activities | | |
|---|---|---|---|---|
| | | **Alternative A** | **Alternative B** | **Alternative C** |
| Crown Fire Potential | Acres | Acres | Acres | Acres |
| Surface | 1664 | 1664 | 2975 | 2775 |
| Passive | 1727 | 1727 | 1337 | 1488 |
| Active | 938 | 938 | 17 | 66 |

Silvicultural activities that target canopy closure have the potential to reduce the development of all types of crown fires (Cruz et al. 2002, Rothermel 1991, Scott and Reinhart 2001, van Wagner 1977) if surface fuels are concurrently treated. Thinning activities would be designed to leave the largest/healthiest trees on site to provide shading of surface fuels and reduced surface wind speeds. Smaller diameter tree densities would be reduced to minimize the potential for crown fire initiation. This partially shaded gap between the surface and crown fuels would again minimize potential crown fire.

An important component when managing forest for wildfire is to provide treated areas or Defensible Fuels Profile Zones that disrupt or alter fire progression and or enhance suppression opportunities. As stated earlier, Defensible Fuels Profile Zones (DFPZs) are not designed to stop fires, but to allow suppression forces a higher probability of successfully attacking a wildfire. The primary reason for the DFPZs is to change the behavior of a wildfire entering the fuels-altered zone. DPFZs may be used as anchor points for indirect or direct attack on wildfires.

To effectively conduct a burn operation (burn out) that minimizes the likelihood of fire control problems and spotting across control lines, firefighters prepare the control line. Prep work includes removing ladder fuels, removing or dispersing surface fuels, and removing low limbs from trees to prevent torching. When burn out is conducted where a fuel treatment has previously occurred, the prep work is already completed or greatly reduced minimizing exposure to firefighters and improving efficiency.

Recent wildfires have demonstrated that DFPZs can reduce fire behavior and increase firefighter safety. Treated areas were utilized during suppression operations along several flanks of these fires for both direct attack with dozers and hand crews as well as indirect attack with burn out operations. When the main fire moved into these treated areas, it transitioned from crown fire to moderate intensity surface fire. This allowed firefighters to directly suppress the fire and safely apply burnout operations.

Alternative B and C were developed and supported through fire modeling and professional experience. Activities pertaining to crown fire occurrence include “thinning from below” designed to alter fire behavior by reducing canopy bulk density, increasing canopy base height, and changing species composition to lighter crowned and fire-adapted species (i.e., Western Larch) where appropriate. The following diagram shows a stand that has been thinned from below, leaving the larger trees to provide shade.

Long range spotting potential decreases as crown fire potential decreases. Firefighter and public safety is thusly increased, and the potential of high intensity fire spreading onto private lands that contain homes and improvements is decreased.

Treatment effectiveness would last for 20 to 30 years in terms of recommended stocking levels (ladder and crown fuels), and could be maintained through understory thinning.

### Fire Travel Times

The combination of commercial harvest, non-commercial thinning, and reduction of surface fuels reduces fire travel times in the project area. Reduction of fire travel times allows for more effective suppression responses to wildfire incidents that occur in the area.

Fire travel times were modeled in identified major fire travel paths for each alternative. A summary of these findings is given in Table 4-25.

**Table 4-25 — Fire Travel Time (Emerging fire from N.F. Umatilla wilderness moving toward Tollgate)**

| Elapsed Time | Distance Traveled | | |
|---|---|---|---|
| | Alternative A | Alternative B | Alternative C |
| 2 Hours | 1 mile | ½ mile | ¾ mile |
| 4 Hours | 2 miles | 1 mile | 1 ¼ miles |
| 8 Hours | 3 ½ miles | 1 ½ miles | 2 miles |

Fire travel time simulations as displayed in Table 4-25 illustrate the effectiveness in reducing fire spread rates after proposed activities. Without treatment, fires initiating in the canyons and progressing toward the plateau would arrive at Langdon Lake and other Tollgate values within the first operational period (the first 16 hours after fire ignition). After the proposed activities in each alternative, the same fire would not arrive at Tollgate or Langdon Lake within the first operational period, and in fact would be well removed from the area until the middle of the following operational period on the subsequent day.

This change in spread rate and travel time would provide space for fire suppression forces to mobilize, plan, and take action on a fire in advance of actual threats to private infrastructure or lands within the Tollgate area. The additional time and space provided by the activities and illustrated by Table 4-25 increases the likelihood that safe, effective, and less costly firefighting operations can occur; and ultimately that firefighting resources can use the DFPZ's to directly engage and quickly contain fires that would otherwise threaten the Tollgate area without treatment.

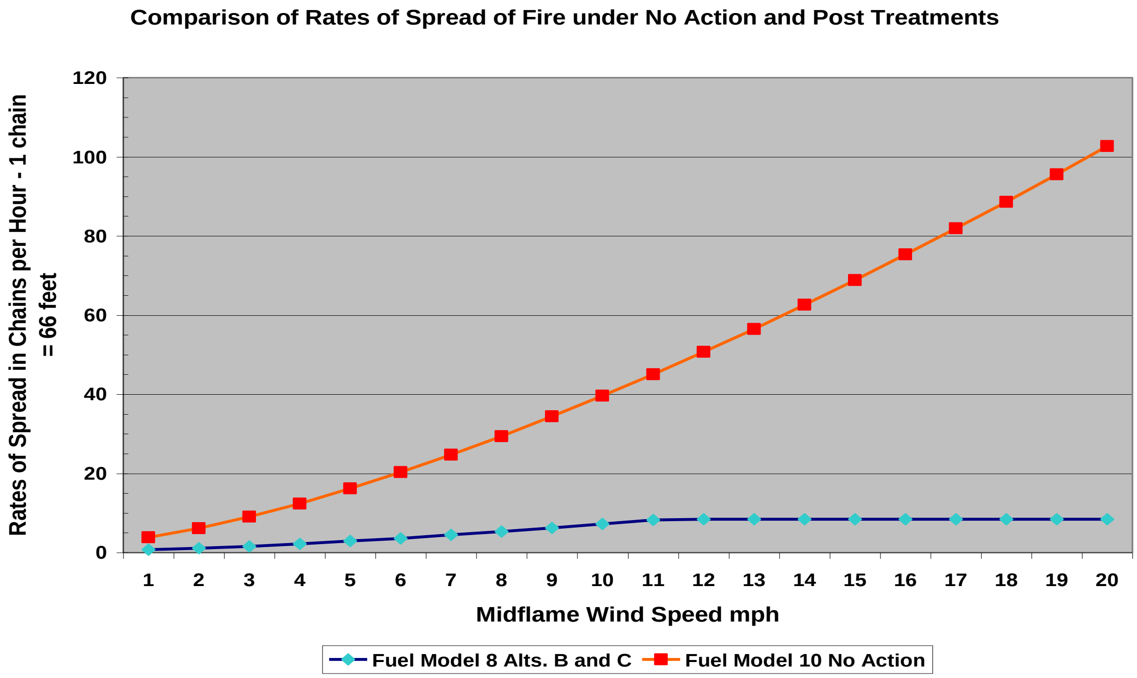


**Figure 4-3 — Comparison of Rates of Spread**

The graph above (Figure 4-3) illustrates the change in predicted spread rates after treatment versus no treatment. Pre-treatment fuel conditions have the potential to spread rapidly as compared to post-treatment fuel conditions. This change in spread rate is the direct result of the change in fuel model that would occur as a result of proposed activities (pre-treatment stand conditions are currently best represented as fuel model 10, while post-treatment conditions can be expected to be best represented as fuel model 8). Importantly, the reduction in spread rates follows the reduction in fire travel times.

### Fire Intensity

The intensity and duration of surface fires depend on the availability and condition of surface fuels (Graham 2004). Down woody fuel can greatly increase the energy released from the surface fires and in some cases increase flame lengths sufficiently to ignite ladder and /or canopy fuels (Graham 2004). Current high surface fuel loadings would be decreased through removal or rearrangement of down dead material.

Flame lengths can be expected to be reduced to 1-3 feet on treated acres. Hand crews can use direct fire suppression tactics when flame lengths do not exceed four feet. Engines and dozers (where roads and terrain allow) can directly fight fire with 4-8 foot flame lengths. Having the opportunity to utilize direct suppression tactics decreases the potential fire size, the risk to public and firefighter safety, and private property (including homes). Table 4-26 illustrates the effects to fire intensity.

**Table 4-26 — Fire Intensity as Represented by Flame Length by Alternative Tollgate Project Area**

| Flame Length (ft.) | Alternative A (acres) | Alternative B (acres) | Alternative C (acres) |
|---|---|---|---|
| < 4ft | 1664 | 2975 | 2775 |

| | | | |
|---|---|---|---|
| 4-8 ft. | 1727 | 1337 | 1488 |
| >8ft. | 938 | 17 | 66 |

Surface fuels activities are expected to last 10-15 years. Maintenance would be required to ensure fuel loadings remain below levels of 10-15 tons per acre.

### Spotting Distance

Long range spotting potential would decrease as crown fire potential decreases. Spotting would decrease in both occurrence and distance as thinned, less dense stands would possess less proclivity to spot than untreated stands. When spotting does occur in treated stands, spotting distances would decrease as group tree torching would be less frequent. Additionally, downwind fire starts would be less prevalent and fuel beds would be less receptive. Table 4-27 displays the effects to spotting distance in the project area.

**Table 4-27 — Spotting Distance by Alternative**

**Tollgate Project Area**

| | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| **Spotting Distance (miles)** | ½ mile | ¼ mile | ¼ mile |

Spotting probability and distance can prove to be a key component to successfully containing a fire at a small size, and to protect critical values within the Wildland Urban Interface. In areas where there is extensive spotting, such as the western United States, fire brands are the main cause of home ignitions (Bar-Massada *et al.* 2011). As probability and distance of spotting increases, the probability of successfully and safely engaging a fire decreases; while inversely, decreasing both the probabilities and distances of spotting greatly increases the chances of protecting values and containing wildland fires at small sizes and of short durations.

### Treatment Adjacency to Private Land

An objective of the Tollgate project is the protection of private land and values, as well as key infrastructure within the planning area. Many units are designed to modify fire behavior directly adjacent to private values and extending ¼ mile out from these values (1/4 mile represents the expected potential spotting distance within treated stands). A comparison of the intensiveness with which activities occur adjacent to and extending ¼ mile from these values is given below in Table 4-28 and is based on the acreage treated within the ¼ mile "rind" around private land and values.

**Table 4-28 — Treatment Acreage within ¼ mile of Private Land Tollgate Project Area**

| | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| **Treatment Acres within ¼ mile of Private Land** | 0 | 757 | 680 |

## *Cumulative Effects for Alternatives B and C*

Activities considered for cumulative impacts are those that modify fire behavior and/or effect suppression capabilities in the analysis area. Specifically, crown fire potential, fire travel times, and fire intensity are the metrics used to quantify cumulative effects. The following past, present, and reasonable foreseeable activities are recognized as having potential cumulative effects relating to fire and fuels within the cumulative effects analysis. These effects are also summarized in Table 4-29.

The cumulative effect analysis area for fire and fuels is the Tollgate Wildland Urban Interface boundary. This area was chosen because it represents the area where activities would occur, and is the area where cumulative effects are important for determining the efficacy of the project.

The time frames chosen for cumulative effects analysis are a “past” of 80 years and a “future” of 20-30 years. The 80 year past time frame was chosen because that is when the Forest Service began fire suppression (every fire start was completely extinguished and the “10 a.m. policy” was instituted, which meant that suppression forces attempted to have all fires under control by 10 a.m. of the day following ignition). Past fire exclusion has led to forest conditions that are in many cases out of the historical range of variability for species composition and forest stand structural classes for many locations. The future time frame of 20-30 years was chosen because this is the approximate length of time that the proposed fuel activities can be expected to be effective without further maintenance. After 20-30 years, new seedlings and saplings would have emerged, adding new ladder fuel components and additional forest litter and downed wood would have collected on the forest floor resulting in increased ground fuel loading.

**Table 4-29 — Past Actions with effects and cumulative effects to Alternatives Band C of the proposed project.**

| | Past Actions (last 80 years) | Present Actions | Future Actions (next 15 years) | Cumulative Effect |
|---|---|---|---|---|
| **Timber Harvest** | Change in species composition, change in stand structure, temporary increase in ground fuel loading, increased crown base height, decreased crown bulk density | N/A | N/A | Increased fuel loading increases fire risk for a short time following harvest; however, most effects of harvest including change in stand structure, increased crown base height, decreased crown bulk density result in a decreased fire risk over a longer time period, 15-30 years. |
| **Fire Suppression** | Missed fire return intervals, increased ground fuel loading and ladder fuels, change in species composition to non-fire tolerant species, increased incidence of insect and disease, increased potential for large crown fire. | Missed fire return intervals, increased ground fuel loading and ladder fuels, change in species composition to non-fire tolerant species, increased incidence of insect and disease. | Missed fire return intervals, increased ground fuel loading and ladder fuels, change in species composition to non-fire tolerant species, increased incidence of insect and disease. | Historical fire suppression efforts would have contributed to the absence of large, low severity fires in the project area, missing two fire return intervals in fire regime I and one in fire regime III. Fire suppression still occurs much as it has over the past 80 years, but fuel activities (as “fire simulators”) have been strategically placed to provide fire breaks: places where fire would be less intense and smaller in size. |
| **Non-commercial Thinning (NCT)** | Increased fine fuel loading for 2-3 years following thinning decreased ladder fuels. | Increased fine fuel loading for 2-3 years following thinning decreased ladder fuels. | Increased fine fuel loading for 2-3 years following thinning decreased ladder fuels. | Fire risk is increased for 2-3 years following thinning; however, ladder fuels are decreased. If a fire were to occur during those years of increased risk, it would remain on the ground and would have flame lengths that would allow for ground suppression. |
| **Personal Use Firewood** | Incidental increase in fine fuel loading following harvest, | Incidental increase in fine fuel loading following harvest, | Incidental increase in fine fuel loading following harvest, | The increase in fine fuels is on such a small scale that it is considered |

| | | | | |
|---|---|---|---|---|
| **Harvest** | decrease in standing dead and thousand hour (8"-24") ground fuel loading. | decrease in standing dead and thousand hour (8"-24") ground fuel loading. | decrease in standing dead and thousand hour (8"-24") ground fuel loading. | insignificant to cumulative effects. |
| **Grazing** | Very little grass to carry fires prior to the 1930's (when grazing regulation began) and for 10 to 20 years following. | Grazing occurs in the project area, but at a much smaller scale then it did historically and is closely regulated. Effects of grazing are negligible. | Grazing occurs in the project area, but at a much smaller scale then it did historically and is closely regulated. Effects of grazing are negligible. | Along with historical fire suppression efforts, grazing would have contributed to the absence of large, low severity fires in the project area, missing two fire return intervals in fire regime I and one in fire regime III. |

In terms of crown fire potential, the stands with high potential have several layers of vegetation with vertical continuity between them: i.e. heavy ground fuels, significant ladder fuels, and a dense overstory. Plantations in the Tollgate project area typically only contain one even-aged layer. Ground fuels were treated following the past harvests, smaller ladder fuels have not yet had the chance to establish in the understory, and there is no larger overstory. Once the stand has been thinned, there is a short time frame in which there is an increased likelihood of fire spread through the stand (in the event of a fire start) because of dried needles remaining on the cut trees for approximately 2 to 3 years. There would also be an increased resistance to control through that time period, since a fire occurring in this stand would have roughly 4-6 foot flame lengths. Even with this possibility of an intense fire with high flame lengths, the potential for crown fire is still low because the stand was just thinned with 16 to 20' tree spacing. There would be no fuels between the ground and the widely spaced trees to carry the fire from ground to crown or from crown to crown. NCT activities would not occur in stands with high crown fire potential within the Tollgate project area and would therefore not contribute to the cumulative effects associated with the proposed project.

### *Consistency Findings with Forest Plan and Regulation/law*

#### Regulatory Consistency

Implementation of Alternatives B or C would comply with the Forest Plan and desired condition for fire and fuels, meet direction provided in the National Fire Plan, and objectives of the Healthy Forest Restoration Act.

# THREATENED, ENDANGERED, AND SENSITIVE PLANTS

## Alternative A No Action

### *Direct/Indirect Effects*

Under Alternative A, none of the proposed fuels activities would be implemented. Alternative A, the 'no action' alternative, would have no impact, direct or indirect, on any currently listed Region 6 sensitive vascular and/or nonvascular plant species.

### *Cumulative Effects*

Since there is no action proposed in Alternative A, there would be no cumulative impacts on sensitive plants.

# Effects Common to All Action Alternatives

## *Direct/Indirect Effects*

The proposed activities on Alternatives B and C include varying amounts of commercial and noncommercial thinning, dead and down wood removal, conventional ground based tractor logging, harvester forwarder logging, landing construction, pile burning, mastication, opening and closing of closed roads, temporary road construction, road realignment, heavy brushing, and danger tree removal along haul routes. These ground disturbing activities could have direct effects of uprooting, burying and/or destroying Regional Forester Sensitive Species List (RFSSL) listed sensitive plant populations if the plants are growing where activities are proposed. Two proposed Tollgate units (73 and 49) have documented RFSSL sensitive plants present or nearby (*Botrychium minganense* and *Botrychium montanum*). Units 73 and 49 are proposed for commercial tractor logging in both Alternatives B and C. With implementation of the design criteria (Table 2-7) this potential destructive direct impact would be avoided. Creation of 'no activity zones' would ensure directional falling of trees away from the zone, no landing construction, no staging of equipment, no ground disturbing actions in the 'zone.'

The other known TES plant populations in the project area are at least 0.5 mile from the nearest proposed treatment unit and none are in the vicinity of proposed construction of temporary roads/landings. There are no direct effects/impacts to these other TES plants listed in Table 3-31.

An indirect effect/impact to sensitive plant populations in the Tollgate project area is the potential for resultant spread of invasive plants from ground disturbing activities. Invasive plants degrade native plant habitat (USDA 2005). Project design criteria to prevent the introduction and spread of invasive plant species can be found in Table 2-7.

Another indirect effect/impact to moonwort species can be changes to site characteristics such as hydrology, microclimate, canopy coverage, or mycorrhizal associations on site as a result of timber harvest, landing construction, road realignment and/or road construction (Ahlenslager 2007). The majority of *Botrychium* sites discussed in chapter 3 affected environment, are greater than 0.5 mile from proposed project activities. The threat of indirect changes to their site characteristics is very small. There may be some indirect impacts to the gray moonwort site in unit 73 and to the mountain moonwort site near unit 49 under both action alternatives B and C.

## *Cumulative Effects*

See Chapter 3 in the Tollgate Fuels Reduction EIS for a complete listing of all 'past, present, and reasonably foreseeable future actions'. The degradation of native plant communities by the invasion of non-native plants is potentially exacerbated by the suite of past, present and reasonably foreseeable future activities including grazing, thinning, recreation, fire suppression, road construction, and road decommissioning in the analysis area. However, the Umatilla National Forest has an ongoing inventory process for invasive plant species, and the tool of Early Detection Rapid Response whereby newly discovered weed infestations can be analyzed and planned for treatment (USDA 2010). In addition, project design features to prevent the spread of weeds are in Chapter 2 in the Tollgate Fuels Reduction EIS and would be implemented as part of the Tollgate Project. With these preventive measures and control tools, the potential risk of degradation of native plant communities as a cumulative effect from implementation of this project would be reduced.

## *Determination of effects to Threatened and Endangered plant species*

Silene spaldingii (Threatened)

As stated previously in the 'Affected Environment' section (Chapter 3), there are no occurrences of *Silene spaldingii* nor is there habitat for *Silene spaldingii* in the Tollgate Fuels Reduction project area. Therefore, the proposed Tollgate project would have no effect on *Silene spaldingii*.

### *Determination of impacts to R6 sensitive vascular and nonvascular plant species*

There would be 'no impact' to *Botrychium pedunculosum, Botrychium paradoxum, Carex cordillerana, Salix farriae, Chaenotheca subrosida,* and *Rhizomnium nudum* as a result of implementing the Tollgate Fuels Reduction Project. Implementation of design criteria stated above for *Botrychium minganense* and *Botrychium montanum* would afford protection from direct physical disruption but the threat of indirect effects remains; the determination is May impact individuals or habitat but not likely to contribute to trend towards federal listing or cause a loss of viability to the population or species.

### *Consistency Findings with Forest Plan and other Regulations/Law*

This project complies with present Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

This project is consistent with the Land and Resource Management Plan for the Umatilla National Forest (1990).

## INVASIVE PLANTS

A series of assumptions is documented in this analysis that allows calculation of the number of acres at high risk of weed spread, depending on the activities and the location of activities in relation to existing weed populations. The underlying premise is that areas closest to existing infestations and undergoing the most soil disturbance will be at the highest risk of supporting future weed spread. To model this effect, "buffer" areas of high risk are calculated around known sites, and their widths are greater as the related activity increases in disturbance potential. Thus, a forwarder unit that includes an existing weed site is assumed to be at high risk for an area 1000 feet from the known weeds, whereas ground that burned at medium severity and has no management activities planned is considered at high risk for an area only 100 feet from a known infestation.

Because there is such uncertainty in predicting both location and timing of invasive species spread, this model is useful primarily in assessing the relative impacts of proposed levels of activity on future **possible** weed infestations. **The purpose is not to predict the actual number of acres that may become infested, but is to show the comparative risk of the different activities and alternatives.** Both of the action alternatives include activities that would increase suitable habitat for invasive plants. The potential for weed establishment within each alternative is relative to the amount of disturbance, especially the amount and type of fuels reduction systems proposed. The greater the area disturbed, the more suitable habitat is created for weeds, and the greater the risk of their establishment and spread. Both action alternatives also include design features to help minimize ground disturbance, limit introduction and transport of weed seed, avoid selected activities in known areas of infestation, reduce disturbance to existing native vegetation, and restore native ground cover as soon as possible after harvest activities are complete.

Assumptions for calculating direct and indirect effects of Alternatives A, B, and C on the distribution of acres at Low, Moderate, or High risk include the following:

- Acreage that is in the roadless area and more than 1000 feet from a known weed population is considered at low risk for weed spread if it supported forest vegetation before the fire.
- Acres at high risk for weed spread include those within 100 feet of an active road or of a known population of a noxious weed.
- Acreage at medium risk for weed spread includes any areas within the project perimeter that are not included in the high or low categories.

Roads have been identified as a primary vector for weed invasion in the current published literature reviewed in the white paper on causal mechanisms of noxious weed spread (Kimberling *et al.* 2004). Forest-wide, the presence of roads is the primary factor predisposing a given area to weed infestation (UMA Road Analysis 2002).

Roadside areas known to be at high risk for invasive plant spread are calculated as those within 100 feet of any system roads, and are included in direct and indirect effects calculations in Table 4-30.

All values for acres at risk are rounded to the nearest 5 acres.

## Alternative A

### *Direct, Indirect, and Cumulative Effects*

The No Action alternative does not include any activities related to the Tollgate Fuels Reduction Project. Other present, and reasonably foreseeable future activities as described in Chapter 3 of the Environmental Impact Statement would continue to occur within the Tollgate planning area. The spread of invasive plants from currently existing populations and off-Forest seed sources is not expected to be extensive, as existing populations, both on and off-Forest, are relatively small and isolated. Furthermore, existing native plant populations are healthy and thriving in the absence of recent wildfire or other disturbances.

**Table 4-30 -- Approximate amount of acres for areas at low, medium, and high levels of risk to noxious weed invasion for action Alternative A**

| Risk Level | Alternative A |
|---|---|
| Low | 21472 |
| Moderate | 21421 |
| High | 3571 |

## Alternatives B and C

### *Direct and Indirect Effects*

Inspecting activity areas and haul routes before and during activities is expected to reduce any increase in weed infestations caused by the spreading of new seed, even if prevention measures are not 100% effective. These prevention measures would not affect spread of any older seed that may be present in the soil seedbank in the vicinity of pre-existing populations. It is not possible to calculate exact acreage reductions resulting from these weed treatments. However, the reductions in areas at risk would be proportional for each action alternative.

Invasion of an area by noxious weeds is known to be facilitated by ground disturbance, loss of plant cover, disruption of functioning native plant communities, and the presence of a weed seed source (Keeley 2004; R6 FEIS 2005). When addressing the spread of invasive plant species, it is impossible to accurately predict spread rates or exact locations of expanding weed populations; however, it is more feasible assess the relative spread risk of various activities based on the degree of ground disturbance involved, and the proximity of existing weed populations that act as seed sources.

Using the same risk assessment methodology described above for Alternative A, levels of noxious weed infestation risk expected to occur as a result of implementing the activities included within action Alternatives B or C were allocated across the Tollgate planning area (Table 4-31). Because Alternative B includes more areas of ground disturbance, the expected amounts of areas at medium and high risk of weed invasion were slightly higher than under Alternative C (approximately 130 and 49 acres, respectively), while the areas of low risk to weed invasion were slightly lower (approximately 178 acres).

**Table 4-31 — Amount of acres for areas at low, medium, and high levels of risk to noxious weed invasion for action Alternatives B and C**

| Risk Level | Alternative B | Alternative C |
|---|---|---|
| Low | 21294 | 21472 |
| Moderate | 20939 | 20809 |
| High | 4232 | 4183 |

Inclusion of a number of design criteria in project activities will help to reduce the risk of invasive species introduction and spread. The criteria are intended to minimize ground disturbance and the exposure of mineral soils, to reduce the introduction of weed seed into areas where ground disturbance is occurring, to minimize the moving of any weed seed that already exists in planning area soils, and to re-establish weed-free ground cover as quickly as possible after any ground-disturbing activities. The detailed design criteria common to all action alternatives are listed in Chapter 2.

### *Cumulative Effects*

This cumulative effects analysis considers the past, present and reasonably foreseeable future actions within and adjacent to the National Forest Lands on the Walla Walla Ranger District within the Tollgate Fuels Reduction planning area. Actions are considered 'reasonably foreseeable' if there has been any public notice or planning regarding an activity, or if future activity can be projected based on ongoing or historical activity in the area with enough specificity to analyze effects.

Past road construction and maintenance, recreation, grazing, wildfire and related suppression activities, timber harvest, and other soil disturbances described in Chapter 3 have provided environments suitable for noxious weed species establishment, vectors for noxious weed dispersal, and infestations of noxious weeds for seed sources. The analysis methodology used for this report takes into account the direct and indirect effects of past, present, and reasonably foreseeable future activities (as described in Chapter 3) on risk of noxious weed invasion, and thereby includes expected cumulative effects with respect to the activities included in Alternatives B and/or C.

Existing infestations are a result of past ground disturbing activities with effects that overlap in space and time with the direct and indirect effects of the activities proposed under Alternatives B or C. Domestic livestock and wildlife can spread invasive plant seeds throughout the planning area. The project area is located within an active allotment ("North End Allotment") with a season of use from June to October. As a result, sheep are within the planning area when seed maturity occurs and likely serve as a vector for seed spread. There will likely be some level of cumulative effects associated with sheep grazing and activities associated with this project. Those effects could include the spread of existing infestations and the establishment of new invasive species. Though design criteria will reduce the cumulative effects, they would likely not be eliminated; however, grazing activities in the North End Allotment are effectively managed to reduce detrimental impacts on soils and native plant communities and minimize opportunities for invasive plant establishment outside of road corridors. As a result, grazing activities in the North End Allotment are not expected to expand areas of high risk above and beyond what is expected to occur as a result of implementing actions included under any of the Alternatives of the Tollgate project.

The spread of invasive plants from currently existing populations and off-forest seed sources will continue at the current level. Animal and vehicle vectors will likely be the primary means of seed introduction into the planning area. The following past, present, and reasonably foreseeable future actions were considered, but, for the reasons cited, did not alter the calculations of acreages in the high and low risk categories for weed spread.

No recent fuels treatments have been carried out within the project boundary in the vicinity of known weed populations, so do not contribute to acreage at high risk. Existing grazing in the area of sheep and/or cattle has not substantially inhibited the ability of native plants to out-compete noxious weeds (USDA Forest Service 2011).

The following items may increase the potential for invasive plant species establishment and spread, but are not expected to cumulatively increase the amount of areas considered as high risk to invasive plant establishment because they occur along roadways, which are already classified as high risk. However, acreage placed at high risk from these activities is speculative, so are not evaluated numerically.

- Larger vehicles traveling away from roadbeds can actually increase potential weed habitat by disturbing and/or compacting soils, and by damaging and weakening existing vegetation. They can also carry and disperse weed seed wherever they go. While system roads are mapped, and can be efficiently patrolled for detection and treatment of associated weed populations, any infestations along unauthorized user-built roads are less likely to be rapidly found and treated. Acreage where this may be occurring is unknown.
- The use of OHVs away from designated roadbeds or trails raises concern for invasive species spread, but these activities are not expected to occur outside areas currently mapped as high risk to invasive plant establishment. While OHVs cause less ground disturbance than larger vehicles such as pick-ups, they can access more varied terrain. If used for unauthorized cross-country travel they can act as wide-ranging seed dispersal vectors, potentially introducing weed infestations into remote and seldom-frequented sites. The amount of unauthorized land use by vehicles is unknown, but it is apparent that at least some such use occurs in portions of the planning area, increasing the risk of spreading invasive species to remote spots where they are not easily detected or treated (Defenders of Wildlife 2002).

## *Consistency Findings with Forest Plan and other Regulations/Law*

The proposed Tollgate Fuels Management Project Project Environmental Impact Statement (EIS) is consistent with the Forest Plan, as amended, with respect to noxious weeds. This finding is based on the the above discussions of existing condition, the mechanisms of invasive species spread, and the inclusion of prevention measures (Table 2-7).

# WILDLIFE

## Old Forest Habitat

### *Alternative A - No Action*

#### Direct/Indirect Effects

The No Action Alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alternative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

The majority of the planning area is considered a Fire Regime III (24,500 acres) or Fire Regime IV (10,900 acres), which typically have long fire return intervals and burn with mixed to high severity (Fuels Specialist Report). The intent of proposed treatments is thus to moderate the Fire Regime and thereby increase the ability to control fires once they start, and limit damage to private property.

Without treatments the Dedicated Old Growth (C1) and other old forest structure would likely remain in its current state in the short term. As long as fires do not occur in the planning area, there would be increasing amounts of old forest, stands with higher tree densities, mid and late seral species, and susceptibility to natural disturbances (Silviculture Specialist Report). Wildland fire under these conditions would exhibit extreme fire behavior and would be difficult to suppress (Fuels Specialist Report). Protection of homes and other structures in the area would be very difficult.

Eventually a wildfire could take out large amounts of old forest. This is a normal and expected occurrence in Fire Regime IV areas (such as the Tollgate plateau), which has a 100-200 year fire cycle. Some wildlife species such as the black-backed woodpecker depend upon such fire events, but species that depend upon unburned old forest structure would be displaced if a large stand-replacing fire occurred.

#### Cumulative effects

No actions would be authorized, therefore based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### *Direct and Indirect Effects Common to Alternatives B and C*

#### Dedicated Old Growth

No actions are proposed within Dedicated Old Growth (MA C1) areas. The current composition, structure, and function of these areas would be maintained under all of the proposed alternatives in the short -term. In the mid and long -term, these dedicated areas may deteriorate to the point they no longer provide old growth habitat, or a wildland fire could alter these stands. These areas would likely become a rich source of large diameter snag habitat.

#### Old Forest Structure and patch size

About 60 percent of the acres proposed for treatment in both Alternatives B and C would affect old forest stands. However, no reduction in the amount of old forest would occur because improvement cutting would leave at least 10 trees per acre ≥ 21” DBH. Most of the OFMS stands to be thinned would convert to OFSS structure, and existing OFSS to be thinned would remain OFSS. The majority of old forest thinning would occur in moist forest (Table 4-32).

At least 10 trees greater than or equal to 21 inches DBH would remain in old forest treatment units. The healthiest large trees and the soundest large snags would remain as the building blocks for present and future stand and wildlife habitat development. While down wood and dead trees would be removed to reduce fuels, all treatment units would maintain snags and down wood in excess of Forest Plan standards.

Road maintenance, removal of danger trees along roads, and the construction and use of temporary roads would have a minimal impact to old forest. The total 2.6 miles of temporary road is comprised of many short spurs within harvest units and would be revegetated. These extensions would be closed to the public, and therefore access to old forest stands for activities such as firewood cutting would not increase.

**Table 4-32 — Acres of commercial and non-commercial thinning in old forest structure**

| Measure (acres) | Alternative | |
|---|---|---|
| | B | C |
| Moist Old Forest commercially thinned | **2050** | **1880** |
| Moist OFSS | 1000 | 900 |
| Moist OFMS | 1050 | 980 |
| Dry Old Forest commercially thinned | **100** | **70** |
| Dry OFSS | 70 | 50 |
| Dry OFMS | 30 | 20 |
| Cold Old Forest commericially thinned - OFSS | 95 | 95 |
| **Total Old Forest commercially thinned** | **2245** | **2045** |
| Additional non-commerical thinning and/or dead down removal | **370** | **220** |
| **Total Old Forest treated** | **2615** | **2265** |

Late seral, shade-tolerant tree species would continue to dominate the Tollgate project planning area landscape, and understory biodiversity would generally be maintained or increase (Silviculture Specialist Report). The amount of old forest in the Tollgate project planning area would remain within or above the historical range of variability in all classes of old forest (Silviculture Specialist Report).

Both overstory and understory tree cover would decrease in extended areas along Highway 204 and nearby residential areas. These stands may be less useable by old growth associated species such as northern goshawk and American marten. The best old growth habitat is found in the surrounding Roadless and wilderness areas with their larger streams and abundant riparian habitat.

### Old Forest Connectivity

In both action alternatives, tree canopy would be reduced in over 2,000 acres of old forest, but improvement cutting (thinning) would result in fully stocked stands conducive to movement of various wildlife species. Old forest structure would continue to be well distributed and connected within the entire project planning area.

## *Direct/Indirect Effects Unique to Alternative B*

Commercial thinning and fuels reduction activities would affect 2,615 acres of old forest, of which roughly half is currently multi strata and half is single stratum. Primary cover types affected are moist grand fir (1,100 acres), spruce and spruce-subalpine fir (1,100 acres) and the remainder in Douglas-fir, western larch, or ponderosa pine.

Affected dry, old forest (100 acres) is primarily a dry grand fir cover type. Only 8 acres in the ponderosa pine cover type and 8 acres in the Douglas-fir cover type would be commercially thinned.

About 370 acres of the above 2,615 would have non-commericial thinning, ladder fuel removal, and/or dead and down wood removal only. No trees greater than 9 inches DBH would be cut.

Some trees greater than or equal to 21 inches DBH DBH would be removed where needed to reduce crown density in 4 units (45, 83, 84, and 95) which total 338 acres. From a wildlife habitat standpoint, there would be fewer large trees to become large snags and down wood in the future on these 338 acres. Because there would still be an average of 10 or more trees per acre over 21 inches DBH., this would be a minor effect.

In general there would be abundant old forest, but it would appear more open near the highway and residential areas. Wildlife species that prefer dense multi layered forest would not utilize the treated stands in the short term, until regeneration grows back in.

## *Direct/Indirect Effects Unique to Alternative C*

Commercial thinning and fuels reduction activities would affect about 2,265 acres of old forest, or 350 acres less than Alternative B.

About 220 acres of the above 2,265 would onlyhave non-commericial thinning, ladder fuel removal, and/or dead and down wood removal, where no trees greater than 9 inches DBH would be cut.

In response to an issue raised during scoping, trees greater than or equal to 21 inches DBH would not be removed in Alternative C unless they pose a safety concern or are needed for operational corridors. There would likely be more than 10 trees per acre over 20 inches DBH, on average, which could provide large tree habitat and future large snags in four units (338 acres).

Effects to old forest are relatively similar to Alternative B in terms of cover types and structure, except they would occur on 350 fewer acres. In general there would be abundant old forest, but it would appear more open near the highway and residential areas. Wildlife species that prefer dense multi layered forest would not utilize the treated stands until regeneration grows back in.

## *Cumulative Effects - Alternatives B and C*

Cumulative effects are evaluated at the project planning area scale. Past timber harvest and roading is reflected in the existing condition. The amount of old forest in the Tollgate project planning area would remain within or above the historical range of variability in all classes of old forest (Silviculture Specialist Report).

Ongoing non-commercial thinning outside of timber harvest units would not affect old forest.

Personal use firewood cutting may occasionally remove large snags (up to 24 inch stump diameter) within 300 feet of open roads. Since open road density is low in this area, and cutting is restricted to 300 feet off of open roads, the effects to snag availability in old forest would be very minor.

Ongoing recreational activities, sheep grazing, and weed treatment would not have cumulative effects to the old forest habitat in this analysis area.

## Management Indicator Species (MIS)

### *Rocky Mountain Elk*

#### Alternative A - No Action

*Direct/Indirect Effects*

Under NEPA, there are no direct or indirect effects of the No Action Alternative, which is defined as not taking any of the proposed actions. However, this does not mean conditions on the ground would remain static.

The amount and distribution of cover and roads would not likely change in the short-term. Over the mid and long-term (beyond 20 years), some stands could grow into thicker hiding cover while others may deteriorate. New openings may be created where trees fall, which would allow pockets of foraging areas to develop.

*Cumulative Effects*

Taking no action would not add to any effects from past, present and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

#### Alternatives B and/or C

*Direct and Indirect Effects Common to Alternatives B and C*

Satisfactory cover and HEI values would remain within forest plan minimum standards (Table 4-33). Total cover would not change because Satisfactory cover within treatment areas would convert to Marginal cover. Satisfactory cover would be reduced by about 2 percent in both alternatives.

Where cover decreases, elk forage quantity and quality would likely increase. Past efforts to control weed sites have been successful and monitoring and treatments would continue. Controls to reduce or eliminate potential weed spread from logging operations would be in place (Invasive Plants Specialist Report). Any new weed sites would be treated as coordinated through the forest invasive plants program.

The HEI value would be reduced by one in both action alternatives versus the current existing condition.

**Table 4-33 — Forest Plan standards and comparison of alternatives in the Tollgate elk analysis area (all FS land within 1 mile of proposed activities)**

| Scale | Measure | Forest Plan Desired | Forest Plan Standard | Alt. A | Alt B | Alt. C |
|---|---|---|---|---|---|---|
| Elk Analysis Area | Satisfactory | 15-20 % | 10 % | 17.8 % | 15.5 % | 15.9 % |

| Scale | Measure | Forest Plan Desired | Forest Plan Standard | Alt. A | Alt B | Alt. C |
|---|---|---|---|---|---|---|
| (28,500 acres) | Cover | | | | | |
| | Total Cover | NA | 30 % | 56 % | 56 % | 56 % |
| | HEI | NA | 45 | 63 | 62 | 62 |

No changes in open road densities would occur. The project would utilize about 46 miles of existing road, of which approximately 16 miles are currently closed. The closed roads would not be open to the public during project activities and would remain closed after the project is completed.

Road maintenance, removal of danger trees along roads, and the construction and use of temporary roads would have a minimal impact to elk. The total 2.6 miles of temporary road is comprised of many short spurs within harvest units and would be revegetated. These extensions would be closed to the public

Motorized vehicles using roads that have been closed for many years may cause elk to temporarily avoid these areas during logging activities. Because activities would take place gradually over several years, and would be spread out spatially, no effects to the elk population would be caused by the use of roads.

#### *Direct/Indirect Effects Unique to Alternative B*

Harvest and fuels treatments would take place on 3,500 acres. Because the treatments are intermediate thinning, low thinning, non-commercial thinning, and ladder fuel removal, all of the treated areas would retain enough trees to continue to provide marginal cover in the short and mid term. Satisfactory cover would be reduced by by 2.3 percent (650 acres) but the amount of total cover would not change (Table 4-33).

#### *Direct/Indirect Effects Unique to Alternative C*

Harvest and fuels treatments would take place on 3,300 acres of total cover, about 200 acres less than Alternative B. Because the treatments are intermediate thinning, low thinning, non-commercial thinning, and ladder fuel removal, all of the treated areas would retain enough trees to continue to provide marginal cover in the short and mid term. Satisfactory cover would be reduced by 1.9 percent (520 acres) but the amount of total cover would not change (Table 4-33).

#### *Cumulative Effects Common to Alternatives B and C*

Cumulative effects are assessed at the Tollgate elk analysis area, which is Forest Service land within 1 mile of all proposed activities. This scale is appropriate given the scale of proposed activities and the mixture of forest plan management areas. It is a large area (28,500 acres), that reduces any dilution of project effects that might occur if the entire 46,460 acre project planning area were used.

Past timber harvest and roading is reflected in the existing condition. Ongoing activities in the area include non-commercial thinning, sheep grazing, weed treatment, recreation uses, and firewood collection.

Ongoing non-commercial thinning and the proposed Swamp unit small sale would open up an additional 150 acres, which cumulatively adds to the reduction of hiding cover for elk, but to a very small degree. Sheep grazing, weed treatments, firewood collection, and recreation uses would continue at existing levels.

The addition of proposed activities would increase the amount of disturbance in the area but would not negatively affect elk distribution or populations. Many other factors besides habitat influence elk numbers, such as weather, predation, and hunter success. In general, little change in elk and deer numbers would be expected with the current hunting strategies set forth by ODFW.

### Forest Plan Consistency

The overall direct, indirect, and cumulative effects would result in a neutral habitat trend. Forest plan standards for elk habitat would be met, and no changes to the elk population are expected. The project is consistent with the forest plan and thus continued viability of Rocky Mountain elk is expected on the Umatilla National Forest.

## *American marten*

### Alternative A - No Action

#### *Direct/Indirect Effects*

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

As long as fires do not occur in the planning area, existing marten habitat would remain in its current state in the short -term. In the long -term, some stands would develop into complex, mature stands, which would provide more marten habitat. Because marten utilize areas of high down wood densities, they would benefit from an increase in snags and down wood as stands mature. However, if a large fire occurred, large amounts of habitat would be eliminated for decades. This is a normal and expected occurrence in Fire Regime IV areas (such as the Tollgate plateau), which has a 100-200 year fire cycle.

#### *Cumulative Effects*

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### Alternatives B and C

#### *Direct/Indirect Effects*

Approximately 15 percent of available marten habitat in the planning area would be affected by thinning in Alternative B (1,500 acres) and 14 percent in Alternative C (1380 acres). A reduction of existing down wood and dense understory would make these areas less suitable for marten denning in the short and mid -term. Most of the affected habitat is around private land and along Highway 204, and there would be very little effect to the large blocks of marten habitat along the larger stream corridors.

Marten habitat would remain abundant in the project planning area. Treated areas would ramain suitable for marten foraging, while the large blocks of habitat along Summer Creek, Lookingglass Creek, and the North Fork Umatilla River would likely be used for denning. Over 8,500 acres of marten habitat would not be affected by proposed activities.

Temporary roads and danger tree removal would have very little or no effect to marten or their habitat.

#### *Cumulative Effects*

Cumulative effects are assessed at the project planning area scale because it is a large area that potentially could provide habitat for one or more reproducing female marten. Proposed activities in combination with other past, ongoing, and potential future projects are not expected to cause cumulative effects to marten or their habitat. Past timber harvest and road construction has occurred throughout the project planning area, which is reflected in the existing condition. Ongoing non-commerical thinning projects and weed treatments generally do not affect marten habitat. The proposed Swamp unit small sale is not within marten habitat. Forest recreation activities such as hunting, hiking, sightseeing, and berry picking take place during the day time when marten are less active. Open road densities would remain low, which restricts the amount of human disturbance.

### Forest Plan Consistency

The overall direct, indirect, and cumulative effects would result in a small negative habitat trend for marten. Because the project impacts less than 2 percent (.015) of the marten habitat on the forest, the the amount of effect from this project is too small to cause changes to the population. The Tollgate project is consistent with the forest plan and thus continued viability of marten is expected on the Umatilla National Forest.

## *Pileated woodpecker*

### Alternative A - No Action

#### *Direct/Indirect Effects*

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground would remain static.

Existing pileated woodpecker habitat would remain in its current state in the short term. In the mid and long -term, more snags would be created as trees die. Stands that are not currently in an old forest condition could develop into mature stands, which would provide additional habitat.

#### *Cumulative Effects*

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### Alternatives B and C

#### *Direct/Indirect Effects*

Approximately 1,375 acres of existing pileated woodpecker habitat (7 percent of habitat in the project planning area) would be affected by tree thinning and fuels treatments in Alternative B. About 1,000 of these acres are potential nesting habitat. Approximately 1,100 acres of existing pileated woodpecker habitat (5.7 percent) would be affected by tree thinning and fuels treatments in Alternative C. About 800 acres of these are potential nesting habitat.Therefore 10 percent of 10,200 acres of potential nesting habitat in the analysis area would convert to foraging habitat in Alternative B, and 8 percent in Alternative C. This is because there would be less canopy closure, fewer snags and down wood.

At least 3 large snags per acre in dry forest and 2 large snags per acre in moist forest would remain in all thinning units. In addition, all functioning snag habitat (broken top, signs of excavation, etc) would be retained wherever possible. Most trees and snags ≥ 21 inches DBH would be retained, as well as an adequate number of replacement trees for future snag development. Some trees greater than or equal to 21 inches DBH DBH would be removed where needed to reduce crown density in 4 units (45, 83, 84, and 95) which total 338 acres. These stands would still be classified as old forest because improvement cutting would leave at least 10 trees per acre ≥ 21" DBH. These units are included in the above reproductive habitat that would convert to foraging habitat. The remaining 9,200 acres of pileated woodpecker reproductive habitat in the project planning area would not be affected by commercial thinning. Other proposed activities such as non-commercial thinning, ladder fuel removal, and temporary roads would have no effect to pileated woodpeckers or their habitat.

#### *Cumulative Effects*

Cumulative effects are assessed at the project planning area scale because it is a large area that potentially could provide habitat for 5-8 pair of reproducing pileated woodpeckers. Past logging in old growth forest has undoubtedly reduced the densityof large diameter snags in the project planning area. This is reflected in the existing condition. Personal firewood collection and roadside hazard tree removals would contribute to snag reductions, however the overall effects on pileated woodpecker habitat would be small because removal occurs only along roads. Firewood removal is limited to trees with less than 24 inches stump diameter.

Ongoing activities such as grazing, non-commercial thinning and weed treatments would have no effect to pileated woodpeckers or their habitat and therefore would not cause cumulative effects in combination with the proposed projects. The proposed Swamp unit small sale is not within pileated woodpecker habitat.When the expected effects from proposed activities are combined with residual, present, and foreseeable future actions in the analysis area, they would all add to past reductions in snag densities. Commercial harvest would result in a minor incremental effect.

### Forest Plan Consistency

The overall direct, indirect and cumulative effects would result in a very small negative habitat trend for pileated woodpecker. Because the project impacts less than 1 percent (.005) of the pileated woodpecker habitat on the forest, the amount of effect from this project is too small to cause changes to the population. The Tollgate Fuels Reduction project is consistent with the forest plan and thus continued viability of pileated woodpecker is expected on the Umatilla National Forest.

## *Three-toed woodpecker*

### Alternative A - No Action

#### *Direct/Indirect Effects*

The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

Existing three-toed woodpecker habitat would remain in its current state in the short -term. There may be increases in insect outbreaks, which would benefit three-toed woodpecker. Fire would create high-quality short term habitat.

#### *Cumulative Effects*

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### Alternatives B and C

*Direct/Indirect Effects*

About 3,400 acres of three-toed woodpecker foraging habitat in Alternative B and 3,100 acres in Alternative C would be affected by proposed activities. About 85 acres of mature lodgepole pine stands that may provide prime nesting opportunities would be affected in both alternatives. Other areas with possible nest habitat in spruce and fir stands that would be affected include 2,200 acres in Alternative B, and 1,985 acres in Alternative C. Approximately 15 percent of possible nesting habitat in the planning area would be affected.

Stand thinning and fuels treatments would reduce tree density, snag density, and down wood abundance. Treatments would likely result in less potential for insect disturbances that three-toed woodpeckers depend upon in the short and mid -term. Because thinning would be light, all old forest would remain old forest, and enough canopy cover would probably remain to allow three-toed woodpecker to continue to use these stands. Some trees greater than or equal to 21 inches DBH DBH would be removed where needed to reduce crown density in 4 units (45, 83, 84, and 95) which total 338 acres. These stands would still be classified as old forest because improvement cutting would leave at least 10 trees per acre ≥ 21" DBH.

The remaining 17,300 acres of potential three-toed woodpecker foraging habitat would not be affected by tree thinning and fuels reduction, and would continue to provide foraging and nesting opportunities. Other proposed activities such as non-commercial thinning, and temporary roads would have no effect to three-toed woodpeckers or their habitat.

*Cumulative Effects*

Cumulative effects are assessed at the Tollgate project planning area scale because it is a large area that potentially could provide habitat for one or more pair of reproducing three-toed woodpeckers. Fire suppression and salvage logging in bug-killed lodgepole pine has undoubtedly reduced the amount of three-toed woodpecker habitat in the project planning area. Past timber harvest is reflected in the existing condition.

Cumulatively the effects of proposed activities in combination with other past, ongoing, and potential future projects are not expected to have lasting negative impacts to three-toed woodpecker populations. There is very little old forest lodgepole pine nesting habitat in this area. Ongoing sheep grazing, non-commerical thinning projects, weed treatments, and recreation activities do not affect woodpecker habitat. The proposed Swamp unit small sale is within three-toed woodpecker foraging habitat, but would affect only 50 acres .

### Forest Plan Consistency

The overall direct, indirect and cumulative effects would result in a very small negative habitat trend for three-toed woodpecker. Because the project impacts only 1 percent of the three-toed woodpecker nesting habitat on the forest, the amount of effect from this project is too small to cause changes to the population. The project is consistent with the forest plan and thus continued viability of three-toed woodpecker is expected on the Umatilla National Forest.

## *Primay Cavity Excavators - Snag Habitat*

### Alternative A - No Action

*Direct/Indirect Effects*

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alternative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

The area would continue to provide snags and large down wood for cavity dependent species. Additional snags and large down wood would be created as overstory mortality occurs and dead trees eventually fall, creating new foraging and nesting habitat. Cavity excavator populations would likely be maintained or increase. Ongoing and potential increases in disease and insect occurrence could improve habitat by creating foraging and nesting habitat (dead wood).

If a stand replacing fire occurred, habitat would be reduced for many cavity-excavator speices, but others would respond positively. The black-backed woodpecker and Lewis' woodpecker would benefit in the short and mid -term, due to their preference for burned stands. Most other woodpecker species would respond to fire by shifting their use to adjacent unburned or lightly burned stands.

#### *Cumulative Effects*

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### Alternatives B and C

#### *Direct/Indirect Effects*

Commercial thinning would take place on 3,445 acres in Alternative B and 3,285 acres in Alternative C. Both Alternatives affect about 9 percent of the forested stands in the planning area.

Some dead trees and down wood may be removed in order to reduce excess fuels and crown fire potential. However, at least **3** large snags ($\geq$ 20 inches DBH) per acre would be retained in all units where they occur. If large snags are not available, snags between 10 and 19 inches would be substituted. In addition, all functioning snag habitat (broken top, signs of excavation, etc) would be retained wherever possible. No prescribed burning is planned, therefore snags would not be burned in post-harvest treatment.

A minimum of 3-6 down logs per acre (in the dry plant association) or 15-20 down logs per acre (in the moist plant association) would be retained to meet Forest Plan standards as amended. A minimum of 16 green trees per acre would be left for future snag development. Most thinning units would exceed this number.

Because the purpose of the Tollgate project is to reduce ladder fuels and crown fire potential, minimal long term impacts to snags are expected. Most trees and snags > 21 inches DBH would be retained, as well as an adequate number of replacement trees for future snag development. Dead trees $\geq$ 9 inches are not targeted for removal in units where dead and down may be reduced. Tree thinning would reduce the density of green trees that might otherwise become future snags; however these stands would remain fully stocked after treatment and would meet long term snag replacement objectives. Recent insect related tree mortality is occurring in the area, creating additional snags.

The average density of large snags (greater than 20 inches DBH) is 4.9 per acre (Table 3-37). At least 3 per acre would remain in treated areas, and all existing snags outside of treated areas would remain unless they are a hazard to operations. In general, managing forests within or towards the historical range of variability should provide habitat for a wide range of cavity excavator species. Snags within harvest units would be retained above the minimum levels required in the Forest Plan, especially in the larger size classes.

#### *Cumulative Effects*

Cumulative effects are assessed at the snag analysis scale. Past fire suppression, salvage logging, and harvest in old growth forest has undoubtedly reduced the density of snags in the Tollgate project planning area. This is reflected in the existing condition.

Recent insect related tree mortality is occurring in the area, creating additional snags.

Personal firewood collection can contribute to snag reductions, however the overall effects on snag dependent wildlife would be small because removal typically occurs along open roads. Other ongoing and proposed activities would have no cumulative effect to dead wood habitat and woodpeckers. The Swamp small sale is in an old clearcut, where there are no existing snags, therefore there would be no cumulative effect to snags.

When the expected effects from proposed activities are combined with residual, present, and foreseeable future actions in the analysis area, they would all add to past reductions in snag densities. Structural habitat for cavity excavating birds would be reduced at the stand scale, but watershed averages would remain relatively constant.

### Forest Plan Consistency

The project would affect less than 1 percent (.005) of the forested land on the Umatilla National Forest. Large snags are not targeted for removal. The overall direct, indirect, and cumulative effects would result in a very small negative habitat trend for primary cavity excavators. The amount of effect from this project is too small to cause changes to cavity excavator populations. Therefore the project is consistent with the forest plan and continued viability of primary cavity excavators is expected on the Umatilla National Forest.

## *Northern goshawk*

### Alternative A - No Action

#### *Direct/Indirect Effects*

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

In the mid and -long term, some stands would continue to grow and develop multiple dense canopy layers. The availability of nesting habitat would increase in the long -term due to a greater abundance of large trees and dense multi-layered habitat, while foraging areas with open understory would be reduced. The susceptibility of stands to high severity wildfires and insect or disease outbreaks would likely increase and could lead to large losses of habitat long -term.

#### *Cumulative Effects*

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### Alternatives B and C

#### *Direct/Indirect Effects*

Timber harvest and fuels treatments follow the Eastside Screens requirements (Forest Plan Amendment # 11) to maintain late old structure stands and connectivity corridors. The intent is to provide short term protections for species dependent on old forest such as northern goshawk. (See Appendix F-Consistency with Eastside Screens).

Proposed activities in Alternative B would affect about 2,200 acres of the potential goshawk nesting habitat in the Tollgate project planning area, and about 1,900 acres in Alternative C (11 to 12 percent).

Fuels treatments would reduce high down wood and snag densities to reduce fuel loading and make stands more resilient to wildfire. Because treatments in these stands would retain almost all of the larger trees, they may still be suitable for goshawk nesting. This would depend on other variables such as slope and distance to water. If active nests are found at any time, they would be protected as specified in the project design criteria (Table 2-7).

Approximately 15,775 acres of potential goshawk nesting habitat in the project planning area would not be affected by proposed activities. Proposed non-commercial thinning, ladder fuel reduction, and temporary roads would have very little or no effect to northern goshawk or their habitat.

#### *Cumulative Effects*

Cumulative effects are assessed at the Tollgate project planning area scale because it is large enough to potentially support several goshawk nesting territories. Alteration of 1,900-2,200 acres of potential nesting habitat would add slightly to past changes in goshawk habitat, which is reflected in the existing condition. Reproductive habitat outside of harvest units (15,775 acres) would remain untouched and continue to provide large areas of contiguous forest.

Past, present, and reasonably foreseeable activities in the area such as sheep grazing, non-commercial thinning, and recreational use in combination with proposed projects would not cause cumulative effects to northern goshawk. The proposed Swamp unit small sale is not within goshawk habitat.

If active nests are found at any time, they would be protected as specified in the project design criteria (Table 2-7).

## *Migratory Landbirds*

### Alternative A - No Action

#### *Direct/Indirect Effects*

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alternative. The current condition of habitats for birds in the planning area would not change in the short term. Snags would likely increase in number, benefiting many snag associated species.

#### *Cumulative Effects*

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

### Alternatives B and C

*Direct/Indirect Effects*

The reduction of crown and ladder fuels would reduce habitat for some birds, but it would also reduce the chances that a large scale uncharacteristic wildfire would eliminate large areas of forest habitat. Some existing snag habitat would decrease within harvest and fuels reduction units, and removal of danger trees along haul routes. Snags would be left in units at levels identified in the design features and management requirements outlined in Table 2-7. The retention of trees $\geq$ 21 inches DBH in most units would reduce the extent of effects to some birds of concern.

Late seral, shade-tolerant tree species would continue to dominate the Tollgate project planning area landscape, and understory biodiversity would generally be maintained or increase (Silviculture Specialist Report).

**Dry Forest Habitat**

Only 8 acres in the ponderosa pine cover type would be commercially thinned. Post harvest, these 8 acres would consist of single story, old forest ponderosa pine.

**Mesic Mixed Conifer Habitat**

Commercial thinning and fuels reduction activities would affect 600 acres of Douglas-fir, grand fir and larch sites in a multi-layered condition. Understory would be reduced in the short term, but would soon grow in. Late seral, shade-tolerant tree species would continue to dominate the Tollgate project planning area landscape, and understory biodiversity would generally be maintained or increase (Silviculture Specialist Report).

**Subalpine**

About 2,000 acres dominated by subalpine fir, Engelmann spruce, lodgepole pine in a multi-layered condition would be thinned. This may allow a denser shrub understory to develop and become better suited for hermit thrush.

**Other Unique Habitats**

Aspen, montane meadow, riparian shrub, and steppe shrubland habitats would not be affected by proposed activities.

*Cumulative Effects*

The scale of analysis for cumulative effects to birds is the project planning area. Past, present, and reasonably foreseeable activities in the area in combination with proposed projects would not cause cumulative effects to bird species. Past activities such as timber harvest is reflected in the existing condition. Ongoing sheep grazing, non-commercial thinning, recreational uses, would not have a cumulative effect on birds of concern due to the limited duration, amount, intensity and location of these and proposed activities.

## Threatened, endangered, and sensitive wildlife and invertebrate species

### *Alternative A - No Action*

*Direct/Indirect/Cumulative Effects*

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative.

The condition of habitats for listed and sensitive wildlife species would not change in the short -term. In the long term habitat would not change other than through natural processes. Growth in vegetation throughout would eventually result in an increase of foraging and security habitat for most species. No negative effects are predicted for any sensitive species.

For the No Action alternative, the Tollgate project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

## *Alternatives B and C*

### *Direct/Indirect Effects*

Because the Umatilla Forest is considered unoccupied, there would be **no effect to Canada lynx**.

Because the project is at least partiallly within a wolf pack's territory, and individual wolves could be affected by increased truck traffic and other activity, the proposed activities in combination with other past, present, and reasonably foreseeable future actions **may impact gray wolf**, but would not likely cause a trend toward federal listing.

The proposed activities would not disturb key wolf areas such as den sites, would not change prey availability, and would not increase public access in the area. If a den or rendezvous site is identified prior to or during project activities, the Forest Service would consult with ODFW personnel to determine if seasonal restrictions or other requirements are necessary. Because these sites are difficult to locate and can change yearly, this would need to be assessed on an ongoing basis throughout the life of the Tollgate project.

Since proposed activities would not alter prey availability or potential use of the area by wolverine, this project would have **no impact to wolverine**. None of the treatment areas are near potential wolverine denning habitat, and it is highly unlikely that wolverine would be present during project activities. No confirmed observations of wolverine have occurred on the forst.

Proposed activities would not affect caves, buildings, or mine adits that attract big-eared bats. The known building roost on private land is over 3 air miles from proposed activities at a very low elevation (2000 feet). This species is not expected to occur where tree cutting activities are proposed on the Tollgate plateau, at a much higher elevation and forest type, and far from the known roost on private land. Since they are not expected to be present near the proposed activities, there would be **no impact to big-eared bat**.

Bald eagle use of the area is incidental and there are no nearby nests. Since it is highly unlikely that individuals would be in close proximity during project activities, there would be **no impact to bald eagle**.

No timber harvest would occur in existing white-headed woodpecker habitat, therefore there would be **no impact to white-headed woodpecker**. It is unlikely that white-headed woodpeckers would occur in this area except as possible wanderers, because there is very little ponderosa pine forest type. About 8 acres of single-story old ponderosa pine habitat would be created by thinning in both Alternatives B and C. Even in addition to existing habitat in the area, this is not large enough to support a pair of reproducing white-headed woodpeckers. No existing nesting habitat would be affected and therefore no impacts to the population would be expected.

No timber harvest would occur in existing Lewis' woodpecker habitat, therefore there would be **no impact to Lewis' woodpecker**. This type of habitat is scarce in the project planning area. The proposed activities would not occur in open ponderosa pine forest, open riparian woodland dominated by cottonwood, and burned pine forest, and it is unlikely that Lewis' woodpeckers are present in the area except as occasional wanderers.

Tree thinning in RHCAs**may impact spotted and tailed frogs, but would not likely cause a trend toward federal listing.** These two species have not been documented in or near project units.

There are 5 units that include treatment within riparian habitat conservation areas (RHCA). This project has been carefully designed to avoid adverse effects to fish and aquatic habitat. There would be no harvest or skidding across active stream channels, but treatment may affect areas 10-20 feet from the streams.

Spotted and tailed frogs have not been observed in these specific areas, but could be present. If they are present during project work, adults can move away. Larvae are confined to the water and less mobile, but project work would not affect water and stream channels directly. Therefore any effects would be limited in time and space and no effects to populations are expected.. .

Proposed activities within riparian areas have been carefully designed to avoid adverse effects to fish and aquatic habitat, but timber harvest would be implemented quite close to the stream channel, up to the edge of the inner gorge, which could be as close as 20 feet from the water's edge. Because there is a small risk of effects, Alternatives B and C **may impact fir pinwheel**, **but would not likely cause a loss of viability or a trend toward federal listing.**

All timber harvest would be outside riparian areas of fish bearing streams. Because western ridged mussel needs fish for glochidia to attach to, proposed activities near non-fishing bearing streams would have **no impact to western ridge mussel**.

Because there is little known about Johnsons' hairstreak and its relationship to mistletoe in the Blue Mountains, it is assumed that most any timber removal could have an effect on the species. Western dwarf mistletoe has not been reported in the ponderosa pines in the analysis area, and Johnson's hairstreak has also not been documented. The Tollgate commercial thinning would affect only 8 acres in the ponderosa pine cover type, and no large pine trees would be removed. Because there is a very slight risk of effects, Alternatives B and C **may impact Johnson's hairstreak, but would not cause a loss of viability or trend toward federal listing.**

### *Cumulative Effects*

Cumulative effects are evaluated at the project planning scale. Ongoing and proposed activities include the proposed Swamp small sale, sheep grazing, non-commercial thinning, firewood collection, and recreational activities.

Sensitive species which may have direct or indirect effects include gray wolf, spotted frog, tailed frog, fir pinwheel, and Johnson's hairstreak.

Because none of the other ongoing or proposed activities would occur within riparian areas, therefore no cumulative effects are expected for spotted frog, tailed frog, and fir pinwheel.

The proposed activities in combination with other past, present, and reasonably foreseeable future actions may impact gray wolf, but would not likely cause a trend toward federal listing because key wolf areas such as den sites would not be disturbed, prey availability is not expected to change, and public access in the area would not increase.

The proposed activities in combination with other past, present, and reasonably foreseeable future actions may impact Johnsons' hairstreak, but would not likely cause a trend toward federal listing. Firewood cutting would not likely impact this species because it is believed to be associated with dwarf mistletoe in live ponderosa pine trees. Firewood cutting of live ponderosa pine is not allowed. Ongoing non-commerical thinning would also not affect Johnson's hairstreak habitat. The Swamp small sale was evaluated for impacts to Johnson's hairstreak, but potential effects were determined to be minor (50 acres) and unlikely (questionable habitat). Therefore minimal, if any cumulative effects are expected for this species.

The following table lists the biological determinations for listed and sensitive species analyzed for this project (Table 4-34).

**Table 4-34 — Summary of effects for Threatened, Endangered, and Sensitive wildlife and invertebrate species (Biological Determinations)**

| Species | Status | Alternative | | |
|---|---|---|---|---|
| | | A | B | C |
| Canada lynx<br>*Lynx canadensis* | Threatened | NE | NE | NE |
| Gray wolf<br>*Canis lupus* | Sensitive | NI | May Impact | May Impact |
| California Wolverine<br>*Gulo gulo* | Sensitive | NI | NI | NI |
| Townsend's big-eared bat<br>*Corynorhinus townsendii* | Sensitive | NI | NI | NI |
| Bald eagle<br>*Haliaeetus leucocephalus* | Sensitive | NI | NI | NI |
| Peregrine falcon<br>*Falco peregrinus* | Sensitive | NI | NI | NI |
| White-headed woodpecker<br>*Picoides albolarvatus* | Sensitive | NI | NI | NI |
| Lewis' woodpecker<br>*Melanerpes lewis* | Sensitive | NI | NI | NI |
| Upland sandpiper<br>*Bartramia longicauda* | Sensitive | NI | NI | NI |
| Painted turtle<br>*Chrysemys picta* | Sensitive | NI | NI | NI |
| Columbia spotted frog<br>*Rana luteiventris* | Sensitive | NI | May Impact | May Impact |

| | | | | |
|---|---|---|---|---|
| Rocky Mountain tailed frog<br>*Ascaphus montanus* | Sensitive | NI | May Impact | May impact |
| Fir pinwheel<br>*Radiodiscus abietum* | Sensitive | NI | May Impact | May impact |
| Western ridged mussel<br>*Gonidea angulata* | Sensitive | NI | NI | NI |
| Johnson's hairstreak<br>*Callophrys johnsoni* | Sensitive | NI | May Impact | May impact |

**NE** No Effect on a proposed or listed species or critical habitat.

**NI** No Impact to R6 sensitive species individuals, populations, or their habitat.

**MI** May Impact sensitive species, but would not likely cause a trend toward federal listing.

## Consistency Findings with Forest Plan and Other Laws and Regulations

### *Forest Plan*

All alternatives would be consistent with Forest Plan standards and guidelines, because they would meet design criteria set for the project, meet standards and guidelines for affected land management allocations, and provide for viable populations of wildlife species. All alternatives would provide for diversity of plant and animal communities in the Tollgate project planning area, based on the suitability and capability of the project planning area.

### *Endangered Species Act*

A biological evaluation (BE) was completed for federally listed and proposed endangered and threatened species, and for animal species currently listed as sensitive on the Regional Forester's Sensitive Species List. Determinations were made that none of the proposed project activities would adversely affect, contribute to a trend toward federal listing, nor cause a loss of viability to listed animal populations or species.

With regards to threatened and endangered species, a determination has been made that the proposed actions would not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives. Consultation for Canada lynx is not necessary since a determination has been made that the proposed activities would have no effect to this species.

### *Migratory Bird Treaty Act*

All action alternatives are consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Conservation Strategy for Landbirds (Altman 2000) was reviewed for effects disclosures. Design features such as retention of adequate snags and down logs, retention of live trees, and avoidance of riparian areas proposed in this project would minimize take of migratory birds and meet the intent of current management direction.

#### *Bald and Golden Eagle Protection Act*

All action alternatives comply with the National Bald Eagle Management Guidelines (USFWS 2007) and the Bald and Golden Eagle Protection Act. Use of the area by eagles is sporadic, and no nesting or roosting habitat would be affected by the proposed activities.

#### *Facilitation of Hunting Heritage and Wildlife Conservation Executive Order*

Action alternatives meet the intent of this order by proposing enhancements to elk winter range and bighorn sheep habitat, and by maintaining and restoring aspen habitat.

# RECREATION

## Alternative A – No Action

### *Direct, Indirect and Cumulative Effects*

The no action alternative would perpetuate the existing management of the setting, facilities and access. Developed and dispersed site campers and cabin renters would remain undisturbed by noise, smoke, or traffic. Dispersed campsite use patterns would remain the same. There would be no effect to travel and access, recreation opportunity spectrum, or sense of place under Alternative A.

## Alternatives B and C

### *Direct and Indirect Effects*

The action alternatives are designed to alter the characteristics of the timber stands in the project area. The alternatives do not directly address recreation facilities. Effects to the recreation resources are primarily related to the harvest and prescribed fire activities and the disturbance that these activities create. There are some effects related to the changes to the recreation setting, however none of the changes are substantial enough to alter the ROS classifications. The harvest activities would create short term effects to the timbered portion of the landscape which could potentially alter the recreation setting. However, the proposed activities are do not alter the setting enough to effect the recreation experience. For further description of these effects, see the scenery resource section of Chapter 4.

Alternative B would carry out commercial thinning, removal of dead and down material, reduce ladder fuels and non-commercial thinning. This alternative utilizes roads for hauling and moving equipment. Landings would be created in areas that are screened from major recreation roads and sites.

Alternative C limits the treatment activities proposed in Alternative B from the Lookingglass IRA, and other Potential Wilderness Areas and Riparian Habitat Conservation Areas other than one unit. Under alternative C, no trees greater than 21 inches DBH would be removed except it is necessary for safety concerns and/or operational needs.

#### Developed and Dispersed Recreation

In *alternatives B and C* the campgrounds, recreation residences and some dispersed campsites would experience an increase in dust and noise during harvest and thinning activities, and by an increase of stand treatment related traffic on haul routes. Alternative B proposes approximately 160 more acres of commercial thinning; therefore the number of loads would be potentially 7% higher for Alternative B.

Woodland, Jubilee Lake and Target Meadows Campgrounds would remain available during and after stand activities.

Some recreationists would be displaced from their desired dispersed campsite, but the effects would be limited to a small number of sites at one time and would cease as soon as treatment of the adjacent unit is complete (generally 1-2 weeks as work is occurring). Hunters may be displaced from their favorite dispersed camping site for one season during the prescribed burning window. Numerous alternative dispersed campsites would continue to be available. Alternative C limits harvest in the IRA and PWAs, therefore the number dispersed campsites that would be affected would not change.

### Travel and access

In alternatives B and C there would be no changes to the existing travel system after treatment. Existing roads and trails that are open to the public would continue to be available. Road maintenance consists of a variety of activity components including surface rock replacement, spot surfacing, roadside brushing, erosion control, logging out, road surface blading, ditch cleanout, slide removal, dust abatement, culvert cleaning or replacement, danger tree removal, and other items that contribute to the preservation of the existing road and its safe use.

In all action alternatives, activities associated with commercial thinning, mechanical fuels reduction, and burning could present temporary safety issues for the public. However, by restoring and maintaining a more sustainable species composition, high intensity fires would be less of a threat to the recreational use of the area, and a safer atmosphere would exist for the recreational user. Increased vehicle traffic during harvest and thinning activities may deter localized recreational user activities.

Under all action alternatives some open roads or portions of open roads may temporarily closed during project activities and would be re-opened as soon as possible after work is completed, especially during hunting seasons.

### Recreation Opportunity Spectrum

The alternatives do not propose actions that would alter effects to the recreation opportunity spectrum. No camping facilities or opportunities would be altered. These changes would not alter the opportunities to a degree that would change the ROS classifications.

### Sense of Place

The project is not expected to make any significant effects that are inconsistent with the Forest niche statement that describes the desired sense of place. The usage and settings are expected to remain consistent. Thinning and clearing ladder fuels would help reduce the hazards of fire which could affect the sense of place by removing large portions of overstory vegetation.

## *Cumulative Effects*

### Developed and Dispersed Camping

No cumulative effects of the project to developed camping are anticipated. All developed facilities that are currently available would continue to be available to the public after implementation. All opportunities for dispersed camping would be available once the project has been completed.

No reasonably foreseeable future projects proposed in the project area are expected to alter the recreation opportunities of the area.

#### Travel and Access, Safety

Under Alternatives B and C, there would be a 116 miles of road utilized for project use within the project.

No long term cumulative effects of harvest and fuels activities to dispersed recreation are anticipated. No reasonably foreseeable future projects are proposed in the project area.

#### Recreation Opportunity Spectrum

There is expected to be no cumulative effects to the Recreation Opportunity provided by the Forest. The vegetation management project alternatives would not contribute cumulatively in any way to altering the recreation opportunity spectrum of the area. Once the project implementation period is complete all existing spectrums of recreation opportunities would continue to be available.

#### Sense of Place

No cumulative effects of harvest and fuels activities to the sense of place are anticipated. The setting and the opportunities would remain consistent.

### *Consistency Findings with Forest Plan and other Regulations/Law*

#### Developed and Dispersed Recreation

All action alternatives would be in compliance with the Forest Plan, forest wide standards and guidelines for recreation (p. 4-47). None of the alternatives would be counter to the standards and guidelines for recreation. There are no regulations or law related to developed or dispersed recreation that the alternatives would violate.

#### Recreation Opportunity Spectrum

The project alternatives are all consistent with the Forest Plan and other regulations and law related to the Recreation Opportunity Spectrum.

#### Access

The project alternatives are all consistent with the Forest Plan and other regulations and law regarding to the recreation related access.

# VISUAL RESOURCES (SCENERY)

## Alternative A – No Action

### *Direct/Indirect and Cumulative Effects (Alternative A)*

The no action alternative would cause no direct or indirect effects. The existing visual quality would remain at modification to retention.

# Alternative B

## *Direct/Indirect Effects*

The units visible from the visually sensitive roads (as determined in the Forest Plan) are shown in the following Table 4-35:

**Table 4-35 — Alternative B Unit Treatment, Visual Quality, and Forest Plan Compliance**

| Unit # | Prescription | Existing Visual Quality | Expected Visual Quality after implementation of Alternative B | Forest Plan Visual Quality Objective | In Compliance with Forest Plan? |
|---|---|---|---|---|---|
| 18 | NCT | R | R | FG/R | Yes |
| 19 | CT, LFR | R | R | FG/R | Yes |
| 20 | LFR | R | R | FG/R | Yes |
| 21 | LFR, DDR | R | R | FG/R | Yes |
| 25 | CT, LFR | PR/R | R | MG/PR,FG/R | Yes |
| 37 | NCT | PR | PR | FG/PR | Yes |
| 38 | CT, LFR | PR | PR | FG/R/PR | Yes |
| 48 | CT, LFR | PR | PR | MG/PR,FG/R | Yes |
| 61 | CT, LFR | PR | PR | FG/PR | Yes |
| 62 | CT, LFR | R | R | FG/R | Yes |
| 64 | CT, LFR | R | R | FG/R | Yes |
| 66 | CT, LFR | R | R | FG/R | Yes |
| 68 | CT, LFR | R | R | FG/R | Yes |
| 71 | CT, LFR | R | R | FG/R | Yes |
| 72 | CT, LFR | R | R | FG/R | Yes |
| 73 | CT, LFR | R | R | FG/R | Yes |
| 76 | CT, LFR | PR | PR | MG,FG/PR | Yes |
| 86 | LFR | R | R | FG/R | Yes |

FG=Foreground, MG=Middleground, R-Retention, PR=Partial Retention

### Predicted effects by unit

*Unit 18*

Precommercial thinning with a masticator of 1-7 inch material are expected to reduce the “thicket” appearance and open up the understory creating a more open forest, which is generally preferred visually. The masticator chips show management that is also an acceptable visual effect that is associated with good forest management. (Bradley, pg 6) The chips would quickly fade and then be screened by forest floor vegetation.

*Unit 19*

Commercial thinning and harvest would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. This treatment would reduce the visual tunnel effect along Hwy 204.

Reducing ladder fuels and dead and down material would open up the understory and clean up the forest floor creating a less chaotic visual scene which is a preferred appearance. The resulting visual appearance would meet retention.

*Unit 20*

Ladder fuel reduction would reduce the understory and midstory vegetation that restricts views into the forest. There are no expected negative visual impacts associated with this treatment. The resulting visual appearance would meet retention.

*Unit 21*

Ladder fuel reduction and removal of dead and down material would reduce the understory and midstory vegetation that restricts views into the forest. This treatment minimizes the chaotic visual appearance which is generally preferred. There are no expected negative visual impacts associated with this treatment. The resulting visual appearance would meet retention.

*Unit 25*

Commercial thinning and harvest would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. This treatment would reduce the visual tunnel effect along Hwy 204. This unit lies primarily above the road bank. Stumps and skid trails associated with activities are not expected to be visible from the road due to the viewing angle from the road. Ladder fuel reduction would reduce the understory and midstory vegetation that restricts views into the forest. There are no expected negative visual impacts associated with this treatment. The resulting visual appearance would meet retention.

*Unit 37*

Precommercial thinning would remove material of 1-7 inches in diameter thus reducing the understory thicket appearance and opening up the stand to greater viewing distances into the stand.

*Unit 38*

Unit 38 lies along the lower side of the road prism, sloping away from the viewer. This viewing angle obscures much of the ground level disturbance associated with timber harvest activities. Commercial thinning and harvest would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. Ladder fuel reduction and removal of dead and down material would reduce the understory and midstory vegetation that restricts views into the forest.

*Unit 48*

Only the immediate foreground area of this unit is visible from the road due to the topography sloping away from the viewer. The stumps in the immediate foreground are to be cut low to the ground and should be screened from view within a growing season. As noted above, commercial thinning and harvest would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. Ladder fuel reduction and removal of dead and down material would reduce the understory and midstory vegetation that restricts views into the forest. The resulting visual appearance would meet retention in the foreground, and partial retention in the middleground.

*Unit 61*

The northwestern corner of Unit 61 is visible from Hwy 204. The unit is heavily timbered. The proposed prescriptions of commercial thinning and harvest would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. Ladder fuel reduction and removal of dead and down material would reduce the understory and midstory vegetation that restricts views into the forest. It is expected that forest floor vegetation would screen stumps and skid trails within one growing season. The treatment would meet retention.

#### *Unit 62*

Unit 62 lies adjacent to Hwy 204 on the eastern side of the road. Much of the unit lies above the cut bank which obscures ground level disturbances. Most of the treatment which includes commercial thinning, harvest, reduction of ladder fuel and dead and down material would not be noticeable to the travelling viewer. Where the unit is not obscured by the road bank, it is expected that the existing forest floor vegetation including huckleberry brush and alder would screen the low cut stumps and skid trails. The treatment would meet retention.

#### *Unit 64*

Unit 64 also lies adjacent to Hwy 204 across from Unit 62, on the lower side of the road prism. The topography slopes dramatically away from the travelling viewer for much of the unit. In some areas the road prism goes through a cut which leaves a raised bank on this side. In these areas the view is limited to the immediate foreground. This is a combination that obscures much of the 1.5 mile long unit. The existing forest floor vegetation would screen the low cut stumps and obscure much of the skid trails. Much of the commercial thinning and harvest would not be apparent in this unit due to the topography, however where the slope does not obscure the activities, again it would open up the tunnel effect to provide views into the adjacent canyon and to vistas beyond. The treatment would meet retention.

#### *Units visible from Bald Mtn. Viewpoint*

The units 67,69,70,71, 72, and 73 are visible from Bald Mtn Viewpoint at a middleground distance. The topography of the units provides an oblique angle to the viewer. At a middleground distance the form and texture area noticeable if they are out of scale or are geometric in form. It is expected that the activities proposed would not create any unnatural forms that are out of scale with the existing openings, nor would the texture be so different as to draw attention or dominate the view. Therefore, the activities are expected to meet middleground retention as viewed from this viewer platform.

#### *Unit 68*

Unit 68 lies along Hwy 204 on the eastern side, sloping gently away from the road prism. The road prism is just below a cut bank along approximately half of the .7 mile long unit. This topographic orientation obscures much of the unit. Only the immediate foreground is visible to the travelling viewer. Stumps and skid trails in the immediate foreground are expected to be screened by existing forest floor vegetation. The proposed treatment of commercial thinning, harvest, reduction of ladder fuel and dead and down material would open up the forest views that are currently very thick and often a continuous wall of tree boles. The predicted views would be preferable to the existing condition. The treatment is expected to meet retention.

#### *Unit 71*

This unit lies behind an opening that is heavily vegetated by alder. The timbered unit is a backdrop to this foreground shrubbery. The unit slopes gently away from the viewing platform. This topographic orientation makes only the edge of the unit visible to the travelling viewer. There are no visual impacts expected to occur due to the activities on this unit. Retention would be retained.

#### *Unit 72*

Unit 72 lies approximately 250 to 350 feet away from Hwy 204. Timber and shrubbery between the highway and the unit effectively screens the unit from the traveling viewer. No impacts to the view are expected from the proposed activities in this unit. Retention would be retained.

#### *Unit 73*

This unit lies adjacent to Hwy 204 on the eastern side of the road. The topography is generally level with the road prism. There appears to be a strip of timber in the immediate foreground. The forest floor vegetation is abundant with 5 to 10 foot shrubbery that is expected to screen the ground disturbance and stumps. The commercial thinning and harvest would reduce the wall effect of the existing tree boles that are stripped of limbs due to the snow blowing activities in the winter. The activities are expected to meet retention.

#### *Unit 76*

Unit 76 lies adjacent to Forest Road 64. The unit is approximately 0.6 miles long. The unit slopes toward the road and is heavily timbered. Commercial thinning and harvest would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. Ladder fuel reduction and removal of dead and down material would reduce the understory and midstory vegetation that restricts views into the forest. The foreground stumps and skid trails are expected to be visible, however the visibility of this elements are not expected to dominate the view. Partial retention is expected to be met.

#### *Unit 86*

This unit is visible from the EJ Haney Viewpoint, however most viewing is primarily of the vista beyond the unit that is within the immediate foreground. The unit lies on the slope facing away from the viewer. Ladder fuel reduction would reduce the understory and midstory vegetation that restricts views into the forest. There are no expected negative visual impacts associated with this treatment. The resulting visual appearance would meet retention.

### Predicted Effects to Hwy 204

The effects to Hwy 204 as a whole are expected to be beneficial. Approximately 5 miles of the hwy viewshed would be treated in some manner. 1.5 miles would have treatment on both sides of the highway. It is expected that the overall appearance would be improved by the activities, creating opportunities for views into the adjacent canyon and vistas beyond, as well as creating a more open and less chaotic appearance on the forest interior. The tunnel effect of a wall of trees on each side would be reduced in the treatment areas.

It is expected that all of the activities proposed in all of the action alternatives would meet the visual quality objectives of the Forest Plan. The impacts would not exceed the limits of visual impacts defined by modification and partial retention.

### Scenic Stability

The proposed activities on Alternative B would treat 4330 acres with commercial and non-commercial thinning which is approximately 10% of the project area. The alternative proposes activities such as removal of dead and down material that also improve fire resiliency, and improve the safety element for suppression efforts. This would slightly improve the scenic stability by strategically placed activities that help fire suppression efforts. The alternative is expected to achieve a moderate scenic stability rating.

# Alternative C

## *Direct and Indirect Effects*

The units visible from the visually sensitive roads (as determined in the Forest Plan) are shown in the following Table 4-36:

**Table 4-36 — Alternative C Unit Treatment, Visual Quality, and Forest Plan Compliance**

| Unit # | Prescription | Existing Visual Quality | Expected Visual Quality after implementation of Alternative B | Forest Plan Visual Quality Objective | In Compliance with Forest Plan? |
|---|---|---|---|---|---|
| 18 | NCT | R | R | FG/R | Yes |
| 19 | CT,LFR | R | R | FG/R | Yes |
| 20 | LFR | R | R | FG/R | Yes |
| 21 | LFR, DDR | R | R | FG/R | Yes |
| 25 | CT | PR/R | R | MG/PR,FG/R | Yes |
| 37 | NCT | PR | PR | FG/PR | Yes |
| 48 | CT, LFR | PR | PR | MG/PR,FG/R | Yes |
| 61 | CT, LFR | PR | PR | FG/PR | Yes |
| 62 | CT, LFR | R | R | FG/R | Yes |
| 64 | CT, LFR | R | R | FG/R | Yes |
| 67 | CT, LFR | R | R | MG/PR | Yes |
| 68 | CT, LFR | R | R | FG/R | Yes |
| 71 | CT, LFR | R | R | FG/R | Yes |
| 72 | CT, LFR | R | R | FG/R | Yes |
| 73 | CT, LFR | R | R | FG/R | Yes |
| 76 | DDR* | PR | PR | MG,FG/PR | Yes |
| 86 | LFR | R | R | FG/R | Yes |

FG=Foreground, MG=Middleground, R-Retention, PR=Partial Retention

The expected direct and indirect effects of activities implemented as a result of adopting Alternative C are the same as those resulting from adopting Alternative B, except for the following units:

#### *Unit 18*

Non-commercial thinning of young, even age stands would reduce the “thicket” appearance that is generally undesired as a visual element. The treatment would create space amidst these stands and provide greater visibility into the stands. Non-commercial thinning does not create visual impacts that are noticeable to the casual observer, thus maintaining foreground retention.

#### *Unit 37*

Non-commerical thinning of young, even-age stands would reduce the understory thicket appearance and opening up the stand to greater viewing distances into the stand. The treatment would create space amidst these stands and provide greater visibility into the stands. Non-commercial thinning does not create visual impacts that are noticeable to the casual observer, thus maintaining foreground retention.

#### *Unit 76*

Unit 76 lies adjacent to FS RD 64. The unit is approximately .6 miles long. The unit slopes toward the road and is heavily timbered. Commercial thinning would increase the space between tree boles and reduce the thick massing that restricts visual viewing distances into the forest. Ladder fuel reduction would reduce the understory and midstory vegetation that restricts views into the forest. The foreground stumps and skid trails are expected to be visible, however the visibility of this elements are not expected to dominate the view. Partial retention is expected to be met.

#### *Predicted Effects to Hwy 204*

The effects to Hwy 204 as a whole are expected to be beneficial, however the activities would not reduce the canopy bulk density therefore the amount of light filtering down to the forest floor would not be increased, thus reducing the opportunity for illumination of the forest floor attributes. Approximately 5 miles of the highway viewshed would be treated in some manner. 1.5 miles would have treatment on both sides of the highway. It is expected that the overall appearance would be improved by the activities, creating opportunities for views into the adjacent canyon and vistas beyond, as well as creating a more open and less chaotic appearance on the forest interior. The tunnel effect of a wall of trees on each side would be reduced in the treatment areas.

It is expected that all of the activities proposed in all of the action alternatives would meet the visual quality objectives of the Forest Plan. The impacts would not exceed the limits of visual impacts defined by modification and partial retention.

### Scenic Integrity

The visual experience of the Tollgate Mountain area as viewed from Hwy 204 is primarily a foreground view of a heavily timbered landscape. There are some vistas that break up the continuous timbered view. There are various man-made elements along this route including cabins, and related outbuildings as well as the driveways, and yards. There are also road maintenance facilities such as the gravel shed and other elements that make this route have an “inhabited” appearance. The Forest Service lands along the route have fewer man-made elements but it too has the recreation residences, SnoParks, and the ski area.

The existing vegetation management visual impacts that are most apparent from Hwy 204 are related to previous clearing along Highway 204 that occurred during road construction and the areas of windthrow around the Andes Prairie Sno-park and the Morning Creek Sno-park. The combined distance of these impacts are approximately 2 miles out of the 25 miles of travel distance from end to end. The percentage of this visual impact is approximately 8%. The project proposed to treat 5 miles of the Hwy 204 viewshed in a manner that would not visibly impact the viewshed in a negative way. It is expected that the long term effects would be beneficial to the viewshed integrity.

The *6400 Rd* viewshed has a much more varied visual character from contiguous forest to open grassy slopes and vistas of the canyon lands. There are areas of visual impact related to timber harvest visible from middleground distances. The proposed project impacts would not create additional visual impacts from middleground views. The openings would not be of unnatural size or shape.

The *6401 Rd* viewshed has visual impacts of recent thinning and mastication that are apparent but not dominant to the view. The activities proposed would be similar to the existing impacts therefore contributing to the cumulative effect to the viewshed. The cumulative effect would continue to be apparent but not dominant to the view therefore partial retention would be maintained.

#### Scenic Stability

The proposed activities on Alternative C would treat 4,010 acres with commercial and non-commercial thinning, which is approximately 9% of the project area with activities that improve fire resiliency, and improve the safety element for suppression efforts. This would slightly improve the scenic stability by addressing strategic areas for fire suppression efforts; however it is not a large enough improvement to alter the rating. This alternative is expected to help maintain a low to moderate scenic stability rating.

### *Cumulative Effects*

Scenic Integrity

The visual experience of the Tollgate Mountain area as viewed from Hwy 204 is primarily a foreground view of a heavily timbered landscape. There are some vistas that break up the continuous timbered view. There are various man-made elements along this route including cabins, and related outbuildings as well as the driveways, and yards. There are also road maintenance facilities such as the gravel shed and other elements that make this route have an "inhabited" appearance. The Forest Service lands along the route have fewer man-made elements but it too has the recreation residences, SnoParks, and the ski area.

The existing vegetation management visual impacts that are most apparent from Hwy 204 are related to previous clearing along Highway 204 that occurred during road construction and the areas of windthrow around the Andes Prairie Sno-park and the Morning Creek Sno-park. The combined distance of these impacts are approximately 2 miles out of the 25 miles of travel distance from end to end. The percentage of this visual impact is approximately 8%. The project proposed to treat 5 miles of the Hwy 204 viewshed in a manner that would not visibly impact the viewshed in a negative way. It is expected that the long term effects would be beneficial to the viewshed integrity.

The *6400 Rd* viewshed has a much more varied visual character from contiguous forest to open grassy slopes and vistas of the canyon lands. There are areas of visual impact related to timber harvest visible from middleground distances. The proposed project impacts would not create additional visual impacts from middleground views. The openings would not be of unnatural size or shape.

The *6401 Rd* viewshed has visual impacts of recent thinning and mastication that are apparent but not dominant to the view. The activities proposed would be similar to the existing impacts therefore contributing to the cumulative effect to the viewshed. The cumulative effect would continue to be apparent but not dominant to the view therefore partial retention would be maintained.

#### Scenic Stability

Activities on this project have contributed toward the improvement of scenic stability. 4,010 acres would have been treated to increase fire resiliency and to create safer ingress and egress for fire fighters. However, there have been very little previous efforts to improve conditions. Therefore, there are no measurable positive or negative cumulative effects to scenic stability in this area.

## Consistency Findings with Forest Plan and other Regulations/Law

### *Alternative B*

Alternative B would achieve a greater visual effect by reducing the "thicket appearance, opening up the canopy to allow filtered light to the forest floor, and opening up potential vistas of the canyon lands. The alterations of the existing condition would be more apparent than alternative C initially, to the traveler who is familiar with the route. To the casual observer, who is unfamiliar with existing conditions, the activities would not be apparent.

### *Alternative C*

Alternative C would also achieve a greater visual effect by reducing the “thicket appearance, and opening up potential vistas of the canyon lands. The alterations of the existing condition would be less apparent than Alternative B initially to the traveler who is familiar with the route. To the casual observer, who is unfamiliar with existing conditions, the activities would not be apparent.

It is expected that both alternatives would comply with Forest Plan visual quality objectives.

# NORTH FORK UMATILLA WILDERNESS

## Effects Common to All Alternatives (A, B, and C)

### *Direct/Indirect and Cumulative Effects*

#### Untrammeled, Undeveloped, and Natural

No project activities are proposed in the North Fork Umatilla Wilderness and, therefore, would have no direct and indirect effects on wilderness qualities of untrammeled, natural, and undeveloped character.

North Fork Umatilla Wilderness within the planning project boundary would retain the current degree of natural integrity. There would be no management changes or improvements to the ecological function within the wilderness and associated inventoried PWAs. Biological and ecosystem functions would likely continue as they are in the present condition.

#### Opportunities for solitude and remoteness

There would be no effects to solitude from timber harvest, mechanical fuel activities or road construction because those actions are not proposed for this area. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the wilderness would reduce a sense of solitude and remoteness in the short-term, during project activity. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the boundary of the wilderness would continue to have short-term effects on opportunities of solitude and remoteness. In the long-term there would be no change to the availability of solitude or primitive recreation.

# POTENTIAL WILDERNESS AREAS (PWAS)

The potential wilderness areas (PWAs) under consideration here are described below:

- **PWAs contiguous to Wilderness** is comprised of acres that meet PWA criteria and are contiguous with the North Fork Umatilla Wilderness.

- ***The Lookingglass PWA*** is comprised of the entire Lookingglass IRA and PWAs contiguous with the IRA.

- ***The Wall Walla River PWA*** is comprised only of the Walla Walla River IRA and PWAs contiguous with the IRA that is located within the Tollgate Fuels Reduction Project planning area. Note: A portion of the Walla Walla River IRA is located outside the project planning area and is not considered in the analysis because no project activities are proposed in or around that portion of the IRA.

- ***Other Isolated PWAs*:** The PWA inventory identified only one PWA that was not contiguous to either of the IRAs or the North Fork Umatilla Wilderness. It is referred to as polygon 362 and is 1,087 acres in size. Polygon 362 is located northeast of the Lookingglass PWA separated by a high voltage powerline disturbance corridor. No project activities are proposed in or around polygon 362, therefore this area would not be analyzed any further.

# PWAs contiguous to North Fork Umatilla Wilderness

## *Spatial and Geographic extent of analysis*

The cumulative effects analysis geographic boundary is the Tollgate fuels Reduction Project Planning area from Highway 204 south to the planning area boundary. This area encompasses the northern half of the North Fork Umatilla Wilderness, all inventoried PWA contiguous with the wilderness and developed lands that are in the vicinity of the wilderness and PWA. This boundary is appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in this area. Given the size of the wilderness (in excess of 12,000 acres in the project planning area) and contiguous PWA (1,151 acres), geographic features (canyons that drop steeply off from the edge of the wilderness and PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the wilderness area boundary and associated PWA.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

There would be no cumulative effects on Potential Wilderness contiguous to the North Fork Umatilla Wilderness because there are no past, present or reasonably foreseeable future activities that would overlap with the activities proposed in the Tollgate Fuels Reduction project in time and space.

## *Alternative A*

### Direct/Indirect Effects

#### *Roadless characteristics*

No project activities are proposed in any inventoried PWAs (1,151 acres) contiguous to the North Fork Umatilla Wilderness. Soils would remain undisturbed. There would be no adverse effects to hydrologic function and condition, water quality, or water yield. Any smoke from prescribed fire activities near these areas would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan.

Plant and animal communities would not be impacted by project activities and habitat for TE&S species and MIS species would not be adversely impacted.

Trailheads into the North Fork Umatilla Wilderness would remain the same as they currently exist and there would be no change to any primitive, semi-primitive, or non-motorized recreation. Trailheads, trail corridors and dispersed campsites may be affected in the short-term by the noise, dust, smoke, and possibly increased traffic in some areas during harvest and burning activities in areas located close-by.

Natural landscapes would remain the same and there are no locally identified unique characteristics in these areas. Old growth areas (management area C-1) would remain as old growth areas. There would be no effects to traditional and sacred properties because no activities would occur to impact these areas.

The smells, sounds and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the PWAs would reduce a sense of solitude and remoteness in the short-term, during project activity. Adjacent activity would not preclude the PWAs from being retained in the PWA inventory.

Change in acres of inventoried PWAs

The approximately 1,151 acres inventoried as PWAs that are contiguous to the North Fork Umatilla Wilderness would not change, because no proposed activities would occur with implementation of alternative A.

### Cumulative Effects

#### *North Fork Umatilla Wilderness and associated contiguous PWAs*

The cumulative effects analysis geographic boundary is the Tollgate fuels Reduction Project Planning area from Highway 204 south to the planning area boundary. This area encompasses the northern half of the North Fork Umatilla Wilderness, all inventoried PWA contiguous with the wilderness and developed lands that are in the vicinity of the wilderness and PWA. This boundary is appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in this area. Given the size of the wilderness (in excess of 12,000 acres in the project planning area) and contiguous PWA (1,151 acres), geographic features (canyons that drop steeply off from the edge of the wilderness and PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the wilderness area boundary and associated PWA.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

Under Alternative A there are no proposed actions that could potentially produce direct or indirect effects. Ongoing activities are expected to occur near the wilderness and PWA contiguous to wilderness include logging activities on private lands, summer home maintenance in the Tollgate Recreation Residence Tract and road maintenance. The smells, sights and sounds associated private timber harvest activities on private lands and with road maintenance activities such as danger tree removal and brushing may reduce a sense of solitude and remoteness above the canyon rims along the edge of the wilderness and PWAs. The feeling of solitude and remoteness in the wilderness below canyon rims to canyon bottoms is not expected to be adversely effected by these activities.

Projects that have occurred within wilderness and associated inventoried PWAs contiguous with the wilderness within the planning project boundary include minor trail construction, trail location, and general trail maintenance including removal of danger trees. These projects are very limited and designed for managing recreation use and primitive/semi-primitive recreation opportunities.

There are no reasonably foreseeable actions proposed for this wilderness and associated inventoried PWAs relevant to this analysis. Tollgate Fuels Reduction project, when combined with past, present, and reasonably foreseeable actions is not expected to have any cumulative effects on wilderness qualities and Roadless characteristics in associated inventoried potential wilderness areas.

## *Alternatives B and C*

### Direct/Indirect Effects

Project activities are proposed to occur on 113 acres of the 1,151 acres of PWA contiguous to the Wilderness under Alternative B and five (5) acres under Alternative C. The activities are designed to reduce overall fuel load and reduce the vertical and horizontal continuity of the fuels within the planning area. The activity units are located mostly along the northeast boundary of the wilderness. Proposed treatment activities are primarily commercial thinning and ladder fuel reduction using tractors and forwarders. Slash Treatments include hand pile and burn, mastication or no slash treatment. No new roads are proposed in any of these areas. See Appendix H, maps H-7 and H-8, Table 4-37, and Table 4-38.

**Table 4-37 — Alternative B units intersecting PWA polygons that are contiguous with the NF Umatilla Wilderness**

| Treatment Unit | Prescription | Treatment Unit Acres | PWA Polygon | PWA Acres Affected |
|---|---|---|---|---|
| 9 | CT, LFR | 17.4 | 110 | 1.4 |
| 10 | CT | 147.7 | 75 | 14.8 |
| 10 | CT | 147.7 | 110 | 6.3 |
| 12 | CT | 16.8 | 75 | 1.2 |
| 12 | CT | 16.8 | 111 | 1.9 |
| 19 | CT, LFR | 17.4 | 84 | 4.8 |
| 20 | LFR | 0.6 | 21 | 0.6 |
| 32 | NCT | 11.5 | 46 | 0.2 |
| 33 | CT, LFR | 27.3 | 105 | 15.2 |
| 64 | CT, LFR | 63.9 | 23 | 2.9 |
| 83 | CT, LFR | 102.1 | 110 | 0.1 |
| 89 | CT, LFR | 57.0 | 52 | 1.3 |
| 94 | CT, LFR | 16.9 | 111 | 2.08 |
| 96 | CT, LFR, DDR | 12.60 | 105 | 3.2 |
| 97 | CT | 32.2 | 111 | 0.40 |
| 98 | CT | 12.0 | 111 | 0.10 |
| 104 | LFR | 75.1 | 111 | 56.7 |
| **Total** | | **908.9** | | **113.3** |

| | | | | |
|---|---|---|---|---|
| | | | | **(113)** |

**Table 4-38 — Alternative C units intersecting PWA polygons that are contiguous with NF Umatilla Wilderness**

| Treatment Units | Prescription | Treatment Unit Acres | PWA Polygon | Affected Acres |
|---|---|---|---|---|
| 19 | CT, LFR | 17.4 | 84 | 4.8 |
| **Total** | | | | **4.8 (5)** |

### *Roadless characteristics*

Evidence of activity would be apparent to varying degrees in treatment areas. The natural appearance of the landscape would be reduced following treatment activities. Stumps, skid trails and slash would be evident where commercial thinning and ladder fuel reduction occurs. Tree density would be reduced which would result in more open stands compared with neighboring untreated areas. The stands would not likely be opened to the point that the skyline of the forest canopy appears highly manipulated to the casual observer. In strategic areas, typically nearer roads, trees would be limbed to about six feet to reduce fuel ladders. These trees would no longer appear natural. Overall, scenic quality and natural appearance would be reduced. These acres would no longer meet PWA inventory criteria found in Forest Service handbook (FSH 1909.12, Chapter 71, due to the presence of stumps, skid trails, slash, changes in stand density and appearance of individual trees that were limbed.

The effects to soils and water are described in detail in the Soils and Hydrology sections of Chapter 4.

Any smoke from prescribed fire activities in these areas would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan. Effects to plant and animal communities are described in detail in the Botany, Forest Vegetation, and Wildlife sections of Chapter 4. The project may Impact Individuals or Habitat of region 6 Sensitive fish species, but it would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. Management Indicator fish species are not expected to indicate adverse effects of the project.

The smells, sounds and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the PWAs would reduce a sense of solitude and remoteness in the short-term, during project activity. Adjacent activity would not preclude the PWAs from being retained in the PWA inventory.

### *Change in acres of inventoried PWAs Contiguous to Wilderness*

Table 4-39 displays the acres of PWA that would remain following proposed activities.

Under Alternative B approximately 113 acres inventoried as PWAs that are contiguous to the North Fork Umatilla Wilderness would no longer meet Roadless characteristics due to proposed activities in those areas. This represents about a 10 % reduction in acres of PWAs contiguous with the wilderness and a less than 1% reduction in total acres of PWA inventoried within the PWA analysis area boundary.

Under Alternative C approximately five acres inventoried as PWAs that are contiguous to the North Fork Umatilla Wilderness would no longer meet Roadless characteristics due to proposed activities in treatment unit 19. This represents a 0.4 % reduction in acres of PWAs contiguous with the wilderness.

The effects to Roadless characteristics on the remaining PWAs contiguous with the wilderness within the planning project boundary where no activities are planned (approximately 1,038 acres in Alternative B and 1,146 acres in Alternative C) would be the same as in Alternative A. These acres would retain their current degree of natural integrity. There would be no management changes or improvements to the ecological function within these inventoried PWAs. Biological and ecosystem functions would likely continue as they are in the present condition.

**Table 4-39 — Change in acres of PWA adjacent to NF Umatilla Wilderness by Alternative**

| Alternative | Acres of PWA adjacent to Wilderness | Acres of PWA no longer meeting inventory criteria | Acres of PWA Remaining | Percent Change |
|---|---|---|---|---|
| A | 1,151 | 0 | 1,151 | 0 |
| B | 1,151 | 113 | 1,038 | -10% |
| C | 1,151 | 5 | 1,146 | -0.4% |

### Cumulative Effects - Alternative B

*North Fork Umatilla Wilderness and associated contiguous PWAs*

The cumulative effects from ongoing activities for alternative B are the same as Alternative A. Implementation of Alternative B would result in 113 fewer acres of PWA contiguous with the Wilderness. These acres of PWA would be removed from the PWA inventory because they would not have naturally appearing landscapes and no longer meet PWA inventory criteria found in Forest Service handbook (FSH) 1909.12, Chapter 71. Removal of these acres would represent about a 10 % reduction in acres of PWAs contiguous with the wilderness and a 0. 7% reduction in total acres of PWA inventoried within the PWA analysis area boundary.

The smells, sounds and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the Wilderness and contiguous PWAs would reduce a sense of solitude and remoteness in the short-term, during project activity. Adjacent activity would not preclude the PWAs from being retained in the PWA inventory.

### Cumulative Effects-Alternative C

*North Fork Umatilla Wilderness and associated contiguous PWAs*

The cumulative effects from ongoing activities for alternative C are the same as Alternative A. Implementation of Alternative C would result in approximately five fewer acres of PWA contiguous with the Wilderness. These acres of PWA would be removed from the PWA inventory because they would not have a naturally appearing landscape and no longer meet PWA inventory criteria found in Forest Service handbook (FSH) 1909.12, Chapter 71. Removal of these acres would represent about 0.4% reduction in acres of PWAs contiguous with the wilderness.

The smells, sounds and possible sighting of mechanical activities and fuel treatment activities proposed in areas adjacent to the Wilderness and contiguous PWAs under Alternative C would reduce a sense of solitude and remoteness in the short-term, during project activity. Adjacent activity would not preclude the PWAs from being retained in the PWA inventory.

## *Findings of Consistency with Forest Plan and other Laws and Regulations*

Implementation of proposed activities occurring adjacent to North Fork Umatilla Wilderness would not impact any of the qualities needed to be consistent with those listed in the definition of wilderness as stated in the 1964 Wilderness Act from Section 2(c). All acres (20,256) within the North Fork Umatilla Wilderness would remain as wilderness with implementation of any alternative. Environmental effects would be fully consistent with Forest Plan management area allocation (B1-Wilderness) standards and guidelines, and would not impair the values for which the wilderness was created. Effects from activities are consistent with guidance in Forest Service Manual (FSM) 2300, Chapter 2320, Wilderness Management.

All 1,151 acres within the inventoried PWAs contiguous with North Fork Umatilla Wilderness would remain within the PWA inventory following implementation of alternative A. Thus, all 1,151 acres would be available for evaluation of potential wilderness (FSH 1909.12, Chapter 72) and preliminary administrative recommendations for wilderness designation (FSH 1909.12, Chapter 73) during forest plan revision. Environmental effects would be fully consistent with Forest Plan management area allocation standards and guidelines.

In Alternative B approximately 1,038 (approximately 90%) of the inventoried PWA acres contiguous with the wilderness would be available for evaluation as potential wilderness. Environmental effects from treatment activities proposed on the remaining113 acres of inventoried PWA would be fully consistent with Forest Plan management area allocation standards and guidelines.

In Alternative C about 1,146 (more than 99%) of the inventoried PWA acres contiguous with the wilderness would be available for evaluation as potential wilderness.

# Lookingglass PWA

## *Effects Common to All Action Alternatives*

### Direct/Indirect Effects

Under Alternative B proposed project activities would have a direct effect on 220 acres of the 5,917 acre Lookingglass PWA (approximately 4% of the PWA). The activities are located in treatment units 26, 38, 69, 70 and 75. See Table 4-40 below.

**Table 4-40 — Alternative B Units intersecting with Lookingglass PWA**

| Treatment Units | Prescription | Treatment Unit Acres | PWA Acres Affected |
|---|---|---|---|
| 26 | LFR | 104 | 104 |
| 38 | CT, LFR | 87 | 86 |
| 69 | CT,LFR | 63 | 3 |
| 70 | CT, LFR | 11 | 4 |
| 75 | CT. LFR, DDR | 52 | 24 |
| | **TOTAL** | | **220** |

Under Alternative C project activities would occur on approximately 11 acres of PWA. The activities are located in treatment area 75 and described in Table 4-41.

**Table 4-41 — Alternative C Units intersecting Lookingglass PWA**

| Treatment Unit | Prescription | Treatment Unit Acres | PWA Affected Acres |
|---|---|---|---|
| 75 | CT, LFR, DDR | 38 | 11 |
| | **TOTAL** | | **11** |

Approximately 4% of the PWA in Alternative B and the less than 1% of the PWA in Alternative C would be directly affected by the proposed activities (Table 4-42). These acres are confined to the outer edges of the PWA, on flatter areas above the topographic break, generally adjacent to roads, private land and areas with evidence of past human activity. The vast core of the PWA (97% for Alternative B and more than 99% in Alternative C) would remain undisturbed and retain the existing degree of Roadless characteristics.

Under Alternative B approximately 221 acres inventoried as Lookingglass PWA would no longer meet Roadless characteristics due to proposed activities in those areas. This represents about a 4% reduction in the PWA and less than 1% reduction in total acres of PWA inventoried in the PWA analysis area.

Under Alternative C approximately 11 acres inventoried as Lookingglass would no longer meet Roadless characteristics due to proposed activities in treatment unit 75. This represents a 0.2 % reduction in acres of Lookingglass PWA.

*High Quality or Undeveloped Soil, Air and Water Quality:* The effects to the Roadless qualities characterized by these resources are described in detail elsewhere in the EIS. In summary short term effects would be diminished in the treatment areas. The long term effect of activities on quality of the Roadless characteristics would be negligible.

*Habitat for Threatened, Endangered, proposed, candidate, and sensitive species and for those species dependent upon large, undisturbed areas of land:* Effects to wildlife are described in detail elsewhere in the EIS. Species such as wolf and wolverine are not expected to be impacted by the project (Wildlife Specialist Report).

*Naturally Appearing Landscapes with High Scenic Quality*: Evidence of activity would be apparent to varying degrees in treatment areas. The natural appearance of the landscape would be reduced following treatment activities. Stumps, skid trails and slash would be evident where commercial thinning and ladder fuel reduction occurs. Tree density would be reduced which would result in more open stands compared with neighboring untreated areas. The stands would not likely be opened to the point that the skyline of the forest canopy appears highly manipulated to the casual observer. In strategic areas, typically nearer roads, trees would be limbed to about six feet to reduce fuel ladders. These trees would no longer appear natural. Overall, scenic quality and natural appearance would be reduced.

*Recreation*: Primitive recreation opportunities, including cross-country hiking, motorcycle riding, mountain biking, horseback riding, and hunting, may be interrupted by the sights, sounds and smells of activities. Hunters and dispersed hunting camps may be displaced while activities are taking place. The sense of solitude at campsites located near treatment areas may also be reduced while project activities are taking place. In the long term treatment areas would again be available although the primitive setting some recreationists seek would be reduced to varying degrees on the treated acres. The vast majority of the PWA would continue to offer the current level of recreation opportunities in natural settings.

The effects to Roadless characteristics on the remaining Lookingglass PWA where no activities are planned (approximately 5,697 acres in Alternative B and 5,906 acres in Alternative C) would be the same as in Alternative A. These acres would retain their current degree of natural integrity. There would be no management changes or improvements to the ecological function within the PWA. Biological and ecosystem functions would likely continue as they are in the present condition.

**Table 4-42 — Change in acres of Lookingglass PWA inventory by Alternative**

| Alternative | Acres of Lookingglass PWA | Acres of PWA no longer meeting inventory criteria | Acres of PWA Remaining | Percent Change |
|---|---|---|---|---|
| A | 5,917 | 0 | 5,917 | 0 |
| B | 5,917 | 220 | 5,697 | -3.7% |
| C | 5,917 | 11 | 5,906 | -0.2% |

### Cumulative Effects

The cumulative effects analysis geographic boundary for Lookingglass PWA is the entire Lookingglass IRA; all inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

The cumulative effects analysis geographic boundary for Walla Walla PWA is the portion of the Walla Walla River IRA that is within the project planning area (about 7,140 acres which is 20% of the IRA), inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

These boundaries are appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in these areas. Given the nature of the geographic features (canyons that drop steeply off from the edge of PWAs and associated PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the PWA boundaries.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

There would be no cumulative effects on Potential Wilderness contiguous to the North Fork Umatilla Wilderness because there are no past, present or reasonably foreseeable future activities that would overlap with the activities proposed in the Tollgate Fuels Reduction project in time and space.

# Walla Walla River PWA

## *Alternative A – No Action, and Alternatives B and C*

### Direct/Indirect Effects

#### *Roadless Characteristics*

There would be no direct effects to the Walla Walla River PWA because no activities are proposed within the boundaries of the PWA. The PWA would retain its current degree of natural integrity. There would be no management changes or improvements to the ecological function within the PWA. Biological and ecosystem functions would likely continue as they are in the present condition

Potential indirect effects may occur from project activities outside the PWA. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the PWA would reduce a sense of solitude and remoteness in the short-term, during project activity. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the boundary of the wilderness would continue to have short-term effects on opportunities of solitude and remoteness. In the long-term there would be no change to the availability of solitude or primitive recreation.

Other potential indirect effects may occur because the landscape would continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within timbered stringers in grass/tree mosaic. There would be more impacts to visual quality (more acres blackened) caused by a wildfire as compared to a treated areas, however, it would be a natural occurrence and expected condition of the landscape.

#### *Changes in acres of Inventoried PWAs*

The short term indirect effects would not preclude any of the PWA from remaining in the inventory. The Walla Walla River PWA inventory would remain unchanged at 7,248 acres.

### Cumulative Effects

The cumulative effects analysis geographic boundary for Lookingglass PWA is the entire Lookingglass IRA; all inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

The cumulative effects analysis geographic boundary for Walla Walla PWA is the portion of the Walla Walla River IRA that is within the project planning area (about 7,140 acres which is 20% of the IRA), inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

These boundaries are appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in these areas. Given the nature of the geographic features (canyons that drop steeply off from the edge of PWAs and associated PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the PWA boundaries.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

There would be no cumulative effects on Potential Wilderness contiguous to the North Fork Umatilla Wilderness because there are no past, present or reasonably foreseeable future activities that would overlap with the activities proposed in the Tollgate Fuels Reduction project in time and space.

# INVENTORIED ROADLESS AREAS

The Inventoried Roadless Areas (IRAs) under consideration here are described below:

- Walla Walla River IRA and
- Lookingglass IRA

## Alternative A – No Action (All IRAs)

### *Direct/Indirect Effects*

#### Roadless Characteristics

There would be no direct effects to the Lookingglass or Walla Walla River IRAs, because no activities would occur in the project planning area. The affected environment would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would likely continue as they are in the present condition.

Potential indirect effects may occur because the landscape would continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within timbered stringers in grass/tree mosaic. There would be more impacts to visual quality (more acres blackened) caused by a wildfire as compared to treated areas, however, it would be a natural occurrence and expected condition of the landscape.

### *Cumulative Effects*

The cumulative effects analysis geographic boundary for Lookingglass IRA is the entire IRA, all inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

The cumulative effects analysis geographic boundary for Walla Walla IRA is the portion of the IRA that is within the project planning area (about 7,140 acres which is 20% of the IRA), inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

These boundaries are appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in these areas. Given the nature of the geographic features (canyons that drop steeply off from the edge of IRAs and associated PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the IRA boundaries and associated PWA.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

Under Alternative A there are no proposed actions that could potentially produce direct or indirect effects. Ongoing activities are expected to occur near the IRAs and PWA contiguous to IRAs including logging activities on private lands and road maintenance. The smells, sights and sounds associated private timber harvest activities on private lands and with road maintenance activities such as danger tree removal and brushing may reduce a sense of solitude and remoteness above the canyon rims along the edge of the IRAs and PWAs. The feeling of solitude and remoteness in the IRAs below canyon rims to canyon bottoms is not expected to be adversely effected by these activities.

Projects that have occurred within IRAs include minor trail construction, trail location, and general trail maintenance including removal of danger trees. These projects are very limited and designed for managing recreation use and primitive/semi-primitive recreation opportunities.

There are no reasonably foreseeable actions proposed for this IRA and associated inventoried PWAs relevant to this analysis under the No Action Alternative. Tollgate Fuels Reduction project, when combined with past, present, and reasonably foreseeable actions is not expected to have any cumulative effects on Roadless characteristics associated with IRAs. Based on the definition provided in the CEQ regulations there would be no cumulative effects for Alternative A.

## Walla Walla River IRA

### *Alternatives B and C*

#### Direct/Indirect Effects

##### *Roadless Characteristics*

In alternatives B and C there would be no direct effects to the Walla Walla River IRA because no activities are proposed within the boundaries of the IRA. The IRA would retain its current degree of natural integrity. There would be no management changes or improvements to the ecological function within the IRA. Biological and ecosystem functions would likely continue as they are in the present condition

Potential indirect effects may occur from project activities outside the IRA. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the IRA would reduce a sense of solitude and remoteness in the short-term, during project activity. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the boundary of the wilderness would continue to have short-term effects on opportunities of solitude and remoteness. In the long-term there would be no change to the availability of solitude or primitive recreation.

Other potential indirect effects may occur because the landscape would continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within timbered stringers in grass/tree mosaic. There would be more impacts to visual quality (more acres blackened) caused by a wildfire as compared to a treated areas, however, it would be a natural occurrence and expected condition of the landscape.

#### Cumulative Effects

The cumulative effects analysis geographic boundary for Lookingglass IRA is the entire IRA, all inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

The cumulative effects analysis geographic boundary for Walla Walla IRA is the portion of the IRA that is within the project planning area (about 7,140 acres which is 20% of the IRA), inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

These boundaries are appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in these areas. Given the nature of the geographic features (canyons that drop steeply off from the edge of IRAs and associated PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the IRA boundaries and associated PWA.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

There would be no cumulative effects on the Walla Walla River IRA because there are no past, present or reasonably foreseeable future activities that would overlap with the activities proposed in the Tollgate Fuels Reduction project in time and space.

# Lookingglass IRA

## *Alternative B*

### Direct/Indirect Effects

Under Alternative B proposed project activities would have a direct effect on 203 acres of the 4,859 acre Lookingglass IRA (approximately 4% of the IRA). The activities are located in treatment units 26, 38 and 75. See Table 4-43.

**Table 4-43 — Alternative B units intersecting Lookingglass IRA**

| Treatment Units | Prescription | Treatment Unit Acres | Lookingglass IRA Acres Affected |
|---|---|---|---|
| 26 | LFR | 104 | 104 |
| 38 | CT, LFR | 86 | 86 |
| 75 | CT. LFR, DDR | 52 | 13 |
| | **TOTAL** | | **203** |

#### *Roadless Characteristics*

The 4% of the IRA that would be directly affected by the proposed activities are confined to its outer edges, on flatter areas above the topographic break, generally adjacent to roads, private land and areas with evidence of past human activity. The vast majority of the IRA (96%) would remain undisturbed and retain the existing degree of Roadless characteristics.

*High Quality or Undisturbed Soil, Air and Water Quality:* Units 38 and 75 include removal of green trees within RHCRAs (Riparian Habitat Conservation Areas). The effects to water temperature and on sediment are so small as to be not measureable. Short-term effects would be minor in the treatment areas, while the long term effect of activities on quality of the Roadless characteristics would be negligible.

*Habitat for Threatened, Endangered, proposed, candidate, and sensitive species and for those species dependent upon large, undisturbed areas of land:* Effects to wildlife are described in detail earlier in this chapter.

*Naturally Appearing Landscapes with High Scenic Quality*: Evidence of activity would be apparent to varying degrees in treatment areas. The natural appearance of the landscape would be reduced following treatment activities. Stumps, skid trails and slash would be evident where commercial thinning and ladder fuel reduction occurs. Tree density would be reduced which would result in more open stands compared with neighboring untreated areas. The stands would not likely be opened to the point that the skyline of the forest canopy appears highly manipulated to the casual observer. In strategic areas, typically nearer roads, trees would be limbed to about six feet to reduce fuel ladders. These trees would no longer appear natural. Overall, scenic quality and natural appearance would be reduced.

*Recreation*: Primitive recreation opportunities, including cross-country hiking, motorcycle riding, mountain biking, horseback riding, and hunting, may be interrupted by the sights, sounds and smells of activities. Hunters and dispersed hunting camps may be displaced while activities are taking place. The sense of solitude at campsites located near treatment areas may also be reduced while project activities are taking place. In the long term treatment areas would again be available although the primitive setting some recreationists seek would be reduced to varying degrees on the treated acres. The vast majority of the IRA (96%) would continue to offer the current level of recreation opportunities in natural settings.

### Cumulative Effects

The cumulative effects analysis geographic boundary for Lookingglass IRA is the entire IRA, all inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

The cumulative effects analysis geographic boundary for Walla Walla IRA is the portion of the IRA that is within the project planning area (about 7,140 acres which is 20% of the IRA), inventoried PWA associated with the IRA and developed lands that are within the vicinity of the IRA.

These boundaries are appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (effects of sight, sound and smell from project activities on sense of solitude and remoteness would occur along in these areas. Given the nature of the geographic features (canyons that drop steeply off from the edge of IRAs and associated PWA, these effects are not expected to interact with any similar effects that might occur elsewhere along or within the IRA boundaries and associated PWA.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

There would be no cumulative effects on the Lookingglass IRA because there are no past, present or reasonably foreseeable future activities that would overlap with the activities proposed in the Tollgate Fuels Reduction project in time and space.

## *Alternative C*

### Direct/Indirect Effects

#### *Roadless Characteristics*

There would be no direct effects to the Lookingglass IRA because no activities are proposed within the boundaries of the IRA. The IRA would retain its current degree of natural integrity. There would be no management changes or improvements to the ecological function within the IRA. Biological and ecosystem functions would likely continue as they are in the present condition.

Potential indirect effects may occur from project activities outside the IRA. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the IRA would reduce a sense of solitude and remoteness in the short-term, during project activity. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the boundary of the wilderness would continue to have short-term effects on opportunities of solitude and remoteness. In the long-term there would be no change to the availability of solitude or primitive recreation.

Other potential indirect effects may occur because the landscape would continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within timbered stringers in grass/tree mosaic. There would be more impacts to visual quality (more acres blackened) caused by a wildfire as compared to a treated areas, however, it would be a natural occurrence and expected condition of the landscape.

#### Cumulative Effects

The cumulative effects from ongoing activities for alternative C are the same as Alternative A. The sounds and possible sighting of mechanical activities and fuel treatment activities proposed in areas adjacent to the IRA under Alternative C would reduce a sense of solitude and remoteness in the short-term, during project activity. Considering past, present and possible future activities, the IRA would retain its Roadless characteristics and current degree of natural integrity. There would be no management changes or improvements to the ecological function within the IRA. Biological and ecosystem functions would likely continue as they are in the present condition.

## Consistency finding with the Roadless Area Conservation Rule

A consistency finding of the Tollgate Fuels Reduction Project with the 2001 Roadless Area Conservation Rule can be found in the Specifically Required Disclosures Section later in this Chapter.

# OTHER UNDEVELOPED LANDS

## Alternative A - No Action

### *Direct/Indirect Effects*

There would be no direct effects to other undeveloped lands because no activities would occur in these areas. The affected environment would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would continue. The landscape would likely continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within upland forest stands which would result in larger acreages of blackened landscapes compared to prescribed fires. Some forest visitors may avoid blackened landscapes until green vegetation returns after 3 to 5 years. Fire is a natural occurrence and expected disturbance process in this landscape. All polygons of other undeveloped lands would continue to not meet inventory criteria as potential wilderness areas and would continue to not be an inventoried Roadless area or a designated wilderness area.

### *Cumulative Effects*

For the No Action alternative, Tollgate Fuels reduction project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations there would be no cumulative effects for the No Action Alternative.

# Effects Common to All Action Alternatives

## *Direct/Indirect Effects*

Fuels reduction treatment would occur on approximately 391 acres of other undeveloped lands in Alternative B and 390 acres in alternative C. There would be no roads constructed in other undeveloped lands under either alternatives.

Appendix H, Maps H-7 and H-8 displays the location of treatment units and other undeveloped lands. Table 4-44 displays a listing of proposed harvest activity units, treatment methods and acres of other undeveloped lands that would be affected under each action alternative.

**Table** 4-45 is a summary of acres of activities proposed under each action alternative within other undeveloped lands.

**Table 4-44 — Interaction between treatment units (Alternative B & C) and Other Undeveloped Lands**

| Treatment Units | Prescription | Treatment Unit Acres | Other Undeveloped lands Affected (acres) Alternative B | Other Undeveloped Acres Affected (acres) Alternative C |
|---|---|---|---|---|
| 10 | CT | 147.7 | 2.1 | 2.1 |
| 21 | LFR, DDR | 13.4 | 4.1 | 4.1 |
| 25 | CT | 47.9 | 31.4 | 31.4 |
| 27 | LFR | 13.9 | 9.0 | 9.0 |
| 31 | NCT | 78.5 | 1.1 | 0.0 |
| 34 | CT, LFR, DDR | 59.1 | 15.5 | 15.5 |
| 35 | CT, LFR | 38.4 | 1.1 | 1.1 |
| 36 | LFR | 23.3 | 0.0 | 0.0 |
| 41 | CT, LFR | 171.7 | 12.2 | 12.2 |
| 42 | CT, LFR | 121.7 | 1.1 | 1.1 |
| 45 | CT, LFR | 104.1 | 1.1 | 1.1 |
| 50 | CT, LFR | 88.8 | 57.9 | 57.9 |
| 51 | CT, LFR, DDR | 53.6 | 17.2 | 17.2 |
| 52 | CT, LFR | 29.4 | 8.9 | 8.9 |
| 54 | CT, LFR | 66.4 | 3.9 | 3.9 |
| 55 | CT, LFR | 13.3 | 0.0 | 0.0 |
| 61 | CT, LFR | 35.8 | 9.8 | 9.8 |
| 62 | CT, LFR | 34.1 | 19.7 | 19.7 |
| 78 | CT, LFR | 50.0 | 0.6 | 0.6 |

| | | | | |
|---|---|---|---|---|
| 81 | CT | 22.1 | 0.3 | 0.3 |
| 83 | CT, LFR | 102.1 | 25.4 | 25.4 |
| 84 | CT, LFR | 84.9 | 43.8 | 43.8 |
| 85 | CT, LFR | 78.1 | 64.2 | 64.2 |
| 86 | LFR | 46.7 | 46.7 | 46.7 |
| 95 | CT, LFR | 47.1 | 9.6 | 9.6 |
| 100 | CT, LFR | 37.3 | 1.8 | 1.8 |
| 101 | CT | 13.5 | 2.4 | 2.4 |
| Total | | | 391.1 | 390.0 |

**Table 4-45 — Proposed Activities in Other Undeveloped Lands by Action Alternative**

| Primary Activities within Other Undeveloped Lands | Alternative B (acres) | Alternative C (Acres) |
|---|---|---|
| CT-Commercial Thinning and associated activity fuels activities | 330 | 330 |
| NCT-Non-Commercial Thinning and associated activity fuels activities | 1 | 0 |
| LFR-Ladder Fuels Reduction | 60 | 60 |
| DDR-Dead and Down Removal | 0 | 0 |
| Total | 391 | 390 |

The descriptions of environmental consequences to the 'intrinsic physical and social values' of other undeveloped lands applies to 286 acres of HCPC's polygons that overlap with other undeveloped lands polygons displayed in Appendix I; maps I-2

The environmental consequences to the 30,751 remaining acres of land within the Tollgate Fuels Reduction project planning boundary that are not IRAs, PWAs or other undeveloped lands are disclosed throughout all other resource sections of Chapter 3. The descriptions of environmental consequences to the 30,751 remaining developed acres applies 1,529 acres of HCPC's polygons that do not overlap with IRAs, PWAs or other undeveloped lands polygons displayed in Appendix H; map H-5 and Appendix I; maps I-2.

Environmental effects to the acres listed above in Table 4-45 and the physical, biological and social values within them are described below.

### Physical and biological resources (soils, water, wildlife, recreation, fisheries, etc.)

For other undeveloped lands within the Tollgate Fuels Reduction project planning area where proposed activities would occur the impacts to soil, water quality, air quality, forage; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources, etc. are essentially the same as disclosed for areas of proposed project activity in previous sections of this chapter and are not reiterated here.

Environmental effects to resources in other undeveloped lands due to the implementation of proposed project activities would be consistent with applicable laws, regulations, and Forest Plan management area standards and guidelines (see previous sections of this chapter for Findings of Consistency for each resource).

#### Social values (apparent naturalness, degree of solitude, sense of remoteness)

Proposed fuel activities in other undeveloped lands would create stumps which would reduce the size of undeveloped polygons. The lands would appear managed and developed. The sights, sounds, and changes in vegetation from activities and use would further decrease the natural integrity and sense of naturalness within treatment units and along roads. All treated units would remain forested after harvest although skid trails, stumps, and landings would be evident. Stand structure would change, therefore, diversity of plant and animal communities may shift from current patterns but ecological diversity would remain (Chapter 3, Vegetation section). Impacts to natural integrity and sense of naturalness would likely be evident until stumps and vegetation canopies are no longer substantially recognizable (about 75 to 100 years). The sounds of machinery from active units would reduce a sense of naturalness and solitude during project operations but would not persist in the long term. Other impacts, such as tree marking paint and logging slash would be visible in the short term (about 5 to 10 years). Impacts such as skid trails and tree stumps would be evident for a longer period. The increased numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation.

#### Change in acres in other undeveloped lands

Other undeveloped lands with no proposed thinning or mechanized activity (2,193 acres in Alternative B and 2,194 acres in Alternative C) would retain their intrinsic physical, biological, and social values as described in the affected environment. They would remain free of developments such as forest roads or timber harvest stumps.

All 2,584 acres of other undeveloped lands would continue to not meet inventory criteria as potential wilderness areas and would continue to not be an inventoried Roadless area or a designated Wilderness area. Table 4-46 is a summary showing the changes in acres for other undeveloped lands by alternative.

**Table 4-46 — Changes in Acres of Other Undeveloped Lands by Alternative**

| ALT. | Acres of Other Undeveloped Land | Acres of Other Undeveloped Land Affected by Treatment (Developed)* | Acres of Other Undeveloped Land Remaining | Percent Change |
|---|---|---|---|---|
| A | 2,584 | 0 | 2,584 | 0 |
| B | 2,584 | 391 | 2,194 | -15% |
|  | 2,584 | 390 | 2,193 | -15% |

### *Cumulative Effects*

The cumulative effects geographic boundary is the Tollgate Fuels Reduction Project planning area (46,464 acres). This boundary is appropriate because it can reasonably be expected that the types of direct/indirect effects expected to occur as a result of the Tollgate Fuels Reduction project (intrinsic physical and biological resources and intrinsic social values) and geographic features (canyons that drop steeply off from the project area) these effects are not expected to interact with any similar effects that might occur elsewhere outside of the project area.

The temporal boundary for this cumulative effects analysis is 10 years. This timeframe is appropriate, because the effects to a sense of solitude and remoteness would be limited to the times when Tollgate Fuels Reduction activities would be occurring since the sights, smells and sounds of mechanical activities would only occur during this projects implementation.

For other undeveloped lands in which project activities would occur the cumulative effects to soil, water quality, air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources are disclosed in previous sections of this chapter and are not reiterated here.

The cumulative impacts to the 'intrinsic physical and social values' of other undeveloped lands applies to 286 acres of HCPC's polygons that overlap with other undeveloped lands polygons displayed in Appendix I; maps I-2.

In the project planning area the increased numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. In the long term (about 50+ years), the project would result in the development of historic open, park-like conditions, characterized by larger diameter trees, though more stumps would be present than currently exist.

Prescribed burning and future wildfires would cumulatively change composition and structure of vegetation which could affect some forest visitor's sense of naturalness and remoteness. Prescribed burning would change composition and structure of vegetation (EA, Chapter 3). For a few years burned areas would display a blackened color. Outside the burned areas, the conditions described in the affected environment would remain unchanged except by natural processes and ongoing management activities such as grazing and hunting.

Apparent naturalness and solitude and remoteness would be cumulatively impacted by grazing, dispersed camping, and motorized ATV and vehicle use on roads. Effects associated with recreational use, including noxious weed spread, hunting, fishing, erosion, litter, and evidence of fire rings, are expected to remain cumulatively minor. Ongoing removal of danger trees along forest roads changes the vegetation but does not change the overall sense of naturalness or sense of solitude along an existing developed transportation corridor. Overall, cumulative impacts from these activities on apparent naturalness, solitude and remoteness is very small (not measurable/indistinguishable) in proportion to the changes anticipated from the direct and indirect impacts of the alternatives disclosed above.

### *Findings of Consistency with Forest Plan and other Laws and Regulations*

Other undeveloped lands with no proposed thinning or mechanized activity (2,194 acres in Alternative B, 2,193 acres in Alternative C,) would retain their intrinsic physical, biological, and social values as described in the affected environment. They would remain free of developments such as forest roads or timber harvest stumps. All 2,584 acres of other undeveloped lands within the project planning area would still not be a potential wilderness area, inventoried Roadless area, or a designated wilderness area. This outcome is consistent with the intent of the land allocation decisions made in the forest plan.

# ECONOMIC ANALYSIS

## Direct and Indirect Effects

Timber values and logging costs have the most direct effect on the economic viability of this project.

Market conditions may fluctuate widely throughout the year, and depending on the time of year the sales are offered for auction, the current estimates may or may not be accurate, which could have an impact on the final sales values. Rising or falling fuel and delivered log prices could create a substantial increase or decrease in sale operation and manufacturing costs. The estimated discounted revenues, costs, present net value (as of 2012), cost-benefit ratio, and jobs created as a result of implementing the activities under Alternatives A, B, or C are described below in Table 4-47.

**Table 4-47 — Financial Summary by Alternative**

| Item | Alt A | Alt B | Alt C |
|---|---|---|---|
| **Discounted Revenues** | 0 | $845,658 | $826,332 |
| **Discounted Costs** | 0 | $487,503 | $457,253 |
| **Present Net Value (PNV)** | 0 | $358,155 | $369,079 |
| **Cost/Benefit Ratio (gross value/ associated costs)** | 0 | 1.73 | 1.81 |
| **CCF (Volume)** | 0 | 29,589 | 27,753 |
| **Jobs Created** | 0 | 139 | 130 |

### *Alternative A*

This alternative would not harvest any timber and therefore would not produce any revenue or support direct, indirect or induced employment, or increased income to local economies. Current downward trends in timber harvesting from National Forests lands would continue into the future. Current employment in the wood products sector of the local economy would remain unchanged.

### *Alternative B*

Alternative B was found to be economically viable with a net present value of $358,155. Alternative B has a lower present net value (PNV) than alternative C because it has slightly higher logging costs. These costs are attributed to logging more acres and slightly larger trees. The cost benefit ratio of this alternative is 1.73. The cost benefit ratio takes into account Forest Service contract administration costs. There are slightly more jobs created in alternative B due to more volume.

### *Alternative C*

Alternative C was found to be economically viable with a net present value of $369,079. Alternative C has a higher PNV than alternative B because alternative C has slightly lower logging costs, with all other associated costs being the same. The cost benefit ratio of this alternative is 1.81. The cost benefit ratio takes into account Forest Service contract administration costs. Alternative C creates slightly fewer jobs than alternative B because of less volume.

## Cumulative Effects

### *Past Activities*

Past timber harvest activities on all ownerships within the local area have affected the viability of timber harvest to the extent that the present industrial infrastructure and workforce have developed as a result of the past activities. The effects of specific activities on the viability of timber harvest are not measurable.

### Present and Reasonably Foreseeable Activities

Due to the competitiveness of the market, and its global nature, none of the alternatives would in themselves affect prices, costs or harvest viability of other present or reasonably foreseeable timber sales in the area.

## SPECIFICALLY REQUIRED DISCLOSURES

This section describes how the action alternatives comply with applicable State and Federal laws, regulations, and policies.

### National Historic Preservation Act

Heritage surveys have been completed. State Historic Preservation Office consultation are conducted under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and Washington State Historic Preservation Officer regarding Cultural Resource Management on National Forests dated April 1997. Identified sites and any newly recorded sites would be protected from all project activities associated with Tollgate Fuels Reduction Project, see the Design Criteria listed in Chapter 2 (Table 2-7). Because heritage resources would not be affected by proposed activities under any action alternative, there would be no effect to any historic property listed in or eligible to the National Register of Historic Places.

### Endangered Species Act (ESA) and Regional Forester's Sensitive Species

Environmental effects of implementing any alternative in Tollgate project planning area are in compliance with the ESA and Regional Forester's Sensitive Species list. The Endangered Species Act requires protection of all species listed as "Threatened" or "Endangered" by Federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service).

Biological Evaluations and Assessments have been completed for all TES plant, aquatic and terrestrial wildlife. Determinations were made that none of the proposed actions would adversely affect, contribute to a trend toward federal listing, nor cause a loss of viability to listed plant, fish, and animal populations or species. Details are found in the Fisheries, TES plants, and Wildlife sections of this chapter.

Consultation with USDI Fish and Wildlife Service and National Marine Fisheries Service are expected to be completed prior to signing of the Record of Decision (ROD). Agreement of findings will include Chinook Salmon Essential Fish Habitat (EFH), which satisfies requirements under the Mangnuson-Stevens Act.

### Clean Air Act

All proposed prescribed burning would be conducted in compliance with National Ambient Air Quality Standards and Oregon Department of Environmental Quality (ODEQ) regulations and restrictions contained in the Oregon Smoke Management Plan (ODEQ Directive 1-4-1-601). Fuel activities can be timed to minimize the impacts of smoke on forest users and local communities. An operator's burn plan is developed prior to ignition. On site weather conditions are monitored before, during, and after an ignition. Ocular smoke observations are made throughout the ignition phase. Residual smoke is monitored for dispersion and direction. No ignitions would occur if there is an air stagnation advisory in place within the northeast Oregon geographic area. No ignitions would occur if existing or forecast conditions would transport measurable smoke into downwind communities. The removal and direct treatment of biomass would reduce emissions should a wildfire occur. The effect of smoke under any action alternative would be short term and restricted to dispersed campgrounds. Particulate matter is not expected to exceed standards in the communities of concern (Elgin, Troy and Eden Bench area). See Air Quality analysis and impacts within the Grande Ronde Wild and Scenic River Corridor.

### Clean Water Act

See Hydrology section of this chapter.

### Prime Farmland, Range Land and Forest Land

No adverse effects on any prime farmland, range land and forest land not already identified in the Final EIS for the Forest Plan would be expected to result from implementation of any alternative.

### Civil Rights, Women and Minorities

No adverse effects on civil rights, women, and minorities not already identified in the FEIS for the Forest Plan would be expected to result from implementation of any alternative. Alternatives B and C would be governed by Forest Service contracts, which are awarded to qualified contractors and/or purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements.

### Treaty Trust Responsibilities

In this analysis, the primary focus of the federal government trust responsibility is the protection of the treaty rights and interests that tribes reserve on land included in this project. Both the Nez Perce Tribe and the Confederated Tribes of the Umatilla Indian Reservation have treaty rights and interests in the Tollgate project planning area. General concerns expressed on past projects are the potential effects on fish habitat and populations and water quality, which are key components of aquatic habitat, and the protection of archaeological sites and traditional cultural properties.

### National Forest Management Act

The Tollgate Fuels Reduction Project is consistent with the National Forest Management Act (NFMA) (36 CFR 219.8(e)) requirements at 16 U.S.C. 1604(E) (i) through (iv) and 16 U.S.C. 1604(F) (i) and (iii).

(E) insure that timber would be harvested from National Forest System lands only where:

(i) soil, slope, or other watershed conditions will not be irreversibly damaged;

(ii) there is assurance that such lands can be adequately restocked within five years after harvest;

(iii) protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat; and

(iv) the harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber; and

(F) insure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an evenaged stand of timber will be used as a cutting method on National Forest System lands only where:

(i) for clearcutting, it is determined to be the optimum method, and for other such cuts it is determined to be appropriate, to meet the objectives and requirements of the relevant land management plan; (iii) cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain;

### Floodplains and Wetlands - Executive Orders 11988 and 11990

Executive Order (EO) 11988 requires the Forest Service to avoid "to the extent possible the long and short term adverse impacts associated with the occupation or modification of floodplains…" Alternatives B and C would avoid all floodplains and affects to floodplains, and are consistent with this EO.

Executive Order (EO) 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands." Alternatives B and C would avoid all wetlands and affects to wetlands, and are consistent with this EO.

### Municipal Watersheds

There is no de-facto or designated municipal watershed in the Tollgate project planning area.

### Energy Requirements

No adverse effects on energy requirements would be expected to result from implementation of any alternative.

### Public Health and Safety

Public health and safety would be improved with Alternatives B and C removing danger trees along haul routes and trailheads within Tollgate project planning area. Additionally, public health and safety would be enhanced by proposed activities under either Alternative during a wildland fire event and it would be protected during implementation of project activities.

### Environmental Justice

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of any alternative, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. Smoke management would keep particulate matter within standards. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts related to contractors implementing harvest, non-commercial thinning, planting, fuels treatment, and burning activities. Racial and cultural minority groups could be prevalent in the work forces that implement these activities. Contracts contain provision clauses which address worker safety.

### Other Jurisdictions

There are a number of other agencies responsible for management of resources within the Cobbler II project planning area. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas, the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife has been contacted regarding this analysis.

The Environmental Protection Agency (EPA) is responsible for enforcement of environmental quality standards, such as those established for water resources, while the Oregon Department of Environmental Quality sets standards, identifies non-point sources of water pollution, and determines which waters do not meet the goals of the Clean Water Act. The EPA has certified the Oregon Forest Practices Act as Best Management Practices. Oregon State compared Forest Service practices used to control or prevent non-point sources of water pollution with the Oregon Forest Practices Act and concluded that Forest Service practices meet or exceed State requirements. These are periodically reviewed as practices change. The Forest Service and Oregon Department of Environmental Quality have signed a Memorandum of Understanding (2/12/79 and 12/7/82) outlining this.

Oregon Department of Environmental Quality (DEQ) and the Oregon Department of Forestry are responsible for regulating all prescribed burning operations. The USDA Forest Service, Region 6, has a Memorandum of Understanding with Oregon Department of Environmental Quality, Oregon Department of Forestry, and the USDI Bureau of Land Management regarding limits on emissions, as well as reporting procedures. All burning would comply with the State of Oregon's Smoke Management Implementation Plan and, for greater specificity, the memorandum of understanding mentioned above.

## *2001 Roadless Area Conservation Rule (RACR) 36 CFR Part 294*

This section provides the basis for, and a finding of, consistency of the activities proposed under Alternative B of the Tollgate Fuels Reduction Project with the 2001 Roadless Area Conservation Rule (“Roadless Rule”), by describing and/or referencing:

- Tree-cutting activities expected to occur within the Lookingglass Inventoried Roadless Area (“Roadless Area”)
- Existing characteristics of ecosystem composition and structure (“ecosystem characteristics”) within the Tollgate Project Planning Area, and relative to ecosystem characteristics resulting from the variability that would be expected to occur under natural disturbance regimes of the current climatic period
- Why tree-cutting activities are needed to maintain or restore ecosystem characteristics within the Tollgate Project Planning Area
- How the project will maintain or improve one or more of the roadless area characteristics as defined in 36 CFR §294.11

### Tree-cutting activities

Timber cutting activities included under Alternative B are expected to occur within the Lookingglass Inventoried Roadless area, and no other Inventoried Roadless Areas. The expected stem diameter sizes of trees to be removed would be of small diameter. Trees per acre (TPA) of stem diameter size classes (inches diameter at breast height, DBH) and acres for forest areas with tree cutting, sale, or removal activities included under Alternative B of the Tollgate Fuels Reduction Project occurring within the Lookingglass Inventoried Roadless Area are shown in Table 4-48.

Planned thinning activities included in Alternative B and occurring in the Lookingglass Inventoried Roadless Area would prioritize smaller-diameter trees for cutting and removal. As a result, Table 4-48 indicates that the vast majority of trees within Units 26, 38, and 75 have stem diameter sizes less than 5 inches at breast height. As a result, the thin-from-below silvicultural prescription (which would prioritize smaller trees for removal until a desired residual tree density is attained) planned for Units 26, 38, and 75, would result in a large majority of cut trees with stem sizes less than 5 inches DBH. For mapped vegetation polygons with 0 trees per acre in the 0-5” DBH size class, the activity proposed under Alternative B is a Ladder Fuel Reduction which would only remove trees <9” DBH. Therefore, within Units 26, 38, and 75, the cutting, sale, or removal of trees within the units would be of generally small diameter.

### Existing Ecosystem Composition and Structure

Ecosystem composition and structure within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period are described in the Forest Vegetation, Fuels, Wildlife, and Fisheries sections of Chapter 3 for the Tollgate Project Planning Area, which contains the Lookingglass Inventoried Roadless Area. Information pertinent to this Roadless Rule consistency finding is briefly discussed below.

Within the Tollgate Project Planning Area, tree density classes are outside Ranges of Variation consistent with natural disturbance regimes (Table 3-26). Specifically, Dry Upland Forest PVG has too little of the Low density class and too much of the High density condition. In the Moist Upland Forest biophysical environment, all three density classes are outside of ranges of variation associated with natural disturbance regimes, such that the Low and Moderate density classes are currently under-represented, and the High density class is extremely over-represented. The units proposed for tree cutting, sale or removal activities within the Lookingglass Inventoried Roadless Area fall into the High and Moderate tree density classes.

**Table 4-48 — Trees per acre (TPA) of stem diameter size (inches diameter at breast height, DBH) classes for forest areas with tree cutting, sale, or removal activities included under Alternative B of the Tollgate Fuels Reduction Project occurring within the Lookingglass Inventoried Roadless Area. Each row represents one mapped vegetation polygon.**

| TPA <5" DBH | TPA >5 and <21" DBH | TPA >21" DBH | Acres |
|---|---|---|---|
| 359 | 173 | 29 | 27.5 |
| 0 | 97 | 26 | 0.1 |
| 220 | 284 | 18 | 31.0 |
| 209 | 139 | 33 | 6.0 |
| 209 | 139 | 33 | 1.2 |
| 209 | 139 | 33 | 1.2 |
| 0 | 64 | 16 | 0.2 |
| 0 | 64 | 16 | 1.5 |
| 0 | 182 | 14 | 18.9 |
| 0 | 196 | 18 | 7.3 |
| 0 | 124 | 19 | 6.5 |
| 1524 | 86 | 38 | 29.4 |
| 1360 | 73 | 34 | 22.1 |
| 2295 | 119 | 30 | 1.0 |
| 0 | 145 | 13 | 0.8 |
| 947 | 90 | 21 | 16.4 |
| 527 | 181 | 28 | 3.3 |
| 53 | 137 | 31 | 10.9 |
| 0 | 68 | 23 | 0.5 |
| 1365 | 88 | 26 | 0.1 |
| 1339 | 177 | 21 | 51.0 |

The units proposed for tree cutting, sale or removal activities within the Lookingglass Inventoried Roadless Area are also categorized as Fire Regime 3 and 4 forests, and classified as Fire Regime Condition Class 2 and 3. These classifications indicate that the forest vegetation species composition and structure have been moderately and/or substantially altered from Ranges of Variability expected to result from natural disturbance regimes of the current climatic period (Barrett et al. 2010). These alterations include moderate to high increases in density, moderate to high encroachment of shade-tolerant tree species, and moderate to high losses over time of fire-tolerant tree species.

#### The need for tree cutting, sale, or removal

Live tree density can be reduced by three methods, alone or in combination: prescribed burning, girdling, or tree cutting. As indicated in Chapter 2, the use of prescribed broadcast burning was considered as a means to reduce tree density, but was not included as an action alternative for several reasons. Tree girdling is extremely cost-prohibitive and would not address project objectives to reduce surface and canopy fuel loading. Therefore, tree cutting and removal is needed to reduce the relative amount of high tree density classes and increase the abundance of low and moderate tree density classes across the Tollgate Project Planning Area, and thereby maintain or restore the characteristics of ecosystem composition and structure within ranges of variability expected to occur under natural disturbance regimes of the current climatic period.

In addition to the need for tree cutting to address tree density concerns across the Tollgate Project Planning Area, tree cutting is also needed specifically within Units 26, 38, and 75 to address problems relating to the Fire Regime Condition Class in these areas, as described above. Specifically, tree cutting is required to reduce increases of tree density and vertical (canopy) vegetation layering within the Units, and use individual tree marking to prioritize for retention of fire-tolerant tree species and cutting/removal of shade-tolerant tree species.

#### Consistency Finding

As indicated in Chapter 1 of this document, the consistency finding of the Tollgate project with the 2001 Roadless Area Conservation Rule ("Roadless Rule") must show that for any activities proposed under any action Alternative occurring within an IRA, one of the circumstances (1(i), 1(ii,), 2, 3 or 4) outlined in 36 CFR § 294.13 exist. In the case of the Tollgate project, the project is expected to maintain or improve one or more of the roadless area characteristics as defined in 36 CFR §294.11expected to "remove generally small-diameter timber," and "is needed…to maintain or restore the characteristics of ecosystem composition and structure…within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period." Because this circumstance (circumstance 1(ii) in 36 CFR § 294.13) exists, and because "high quality…soil, air and water quality" (a roadless area characteristic for the Lookingglass IRA) will be maintained, the activities included under Alternative B of the Tollgate project are consistent with the 2001 Roadless Rule.

### *Special Use Permits*

There are several special use permits within the Tollgate project planning area including the Spout Springs Ski Area, numerous Recreation Residences, a Communication Site housing serving local law enforcement and various cellular providers.

## OTHER RESOURCE CONCERNS AND OPPORTUNITIES

### *Relationships Between Short-Term Use and Long-Term Productivity*

Maintenance of healthy soils in terms of organic matter and structure is a key prerequisite to maintaining healthy ecosystems. Long-term productivity depends on maintaining the basic ecosystem resources and their function. For this project, implementation of standards and guidelines as outlined in the FEIS for the Forest Plan are designed to provide for continued long-term site productivity. However, there would be some short-term effects related to the implementation of any of the action alternatives. There are no adverse effects associated with implementing any of the action alternatives that are not already identified in the FEIS for the Forest Plan (Chapter 4, pages IV 230-231).

## *Probable Adverse Environmental Effects that Cannot be Avoided*

There are no unavoidable adverse effects associated with implementing any of the action alternatives that are not already identified in the FEIS for the Forest Plan (Chapter 4, pages IV 228-230).

## *Irreversible and Irretrievable Commitment of Resources*

Irreversible commitment of resources refers to a loss of future options – once executed it cannot be reversed. Irreversible is primarily relevant to the extraction of use of nonrenewable resources, such as minerals, cultural resources, or to those factors (such as soil productivity) that are renewable only over long periods of time. An irretrievable commitment of resources refers to a loss of production or use of natural resources for a time. For example, timber production is lost irretrievably while an area is serving as a winter ski area. The production is irretrievable, but the action is not irreversible. If the land use changes, it is possible to resume production.

There are no unavoidable adverse irreversible effects associated with implementing any action alternatives that are not already identified in the FEIS for the Forest Plan (Chapter 4, pages IV 231-233).

There is an irretreviable effect associated with the removal of timber within areas that have been identified, using the Potential Wilderness inventory criteria found at FSH 1909.12 Chapter 70, as Potential Wilderness within the project planning area. These areas are confined to actions within Alternative B. These acres would result in visibibly detectable signs of timber harvest (such as stumps and skid trails) which would preclude the areas inclusion as part of the inventory until such a future time as the signs of past harvest are no longer visible (likely several decades). The effects of project activities on Potential Wilderness is disclosed above. Although these areas would not be included as part of the Forest Service's Potential Wilderness inventory, they would not necessarily eliminate the possibility of the areas inclusion as wilderness at some point by Congressional action.

## *Congressionally Designated Areas*

The North Fork Umatilla Wilderness is a Congressionally designated wilderness area which occurs partially within the Tollgate project planning area. The North Fork Umatilla is 20,256 acres in size. No activities are proposed to occur within the Wilderness area under either alternative. Indirect effects (such as sights and sounds) associated with the implementation of project activities are discussed above.

## *Potential Conflicts with Plans and Policies of Other Jurisdictions*

Possible conflicts with plans and policies of other jurisdictions, such as the State of Oregon or local counties, have been considered. There are no known conflicts with plans and policies of other jurisdictions associated with implementing the alternatives. The FEIS for the Forest Plan (Chapter 4, Pages IV 226-227) discusses this in further detail.

# CHAPTER 5 – AGENCIES, ORGANIZATIONS, PERSONS CONSULTED, AND LIST OF PREPARERS

# PREPARERS AND CONTRIBUTORS

| | |
|---|---|
| David Powell | Silviculturist |
| Holly Harris | Wildlife Biologist |
| Tyson Albrecht | Fuels |
| Stacia Peterson | Hydrologist |
| David Crabtree | Fish Biologist |
| Steve Anderson | Road/Trail Manager |
| Donna Mattson | Recreation/ Visuals |
| Larry Randall | Potential Wilderness, Other Undeveloped Lands, Inventoried Roadless Areas |
| James Archuleta | Soil Scientist |
| Joan Frazee | Botany |
| Robin Harris | GIS |
| Eric Tonn | Economics |
| Jill Bassett | Heritage |
| Eric Pfeifer | Interdisciplinary Team Leader/ NEPA specialist |

## Collaborative Process Participants

The following individuals attended at least two of the collaborative working group meetings held during winter of 2008 and Spring of 2009.

- Mary Louise Chapman
- Bernard Chapman
- Rod Morrow
- Marcella Morrow
- Norm Kralman
- Ray Denny
- David King
- Julia Lauch
- Tom Insko

# LISTS OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RECEIVING A COPY OF THE DEIS OR NOTIFICATION OF WEB AVAILABILITY

## Washington and Oregon State Government and Agencies

Columbia County Board of Commissioners

Inland Northwest Wildlife Council

Wallowa County Board of Commissioners

Union County Board of Commissioners

Washington Dept. of Wildlife, Region 1 Habitat Program

Oregon Dept. of Fish and Wildlife

Oregon Dept. of Forestry

Oregon Dept. of Environmental Quality

Oregon State Division of State Lands

Umatilla County Watermaster

Umatilla County Board of Commissioners

Umatilla Basin Watershed Council

Grande Ronde Model Watershed Program

Bureau of Indian Affairs

Columbia River Inter-Tribal Fish Commission

## Federal Agencies

Deputy Director, USDA APHIS PPD/EAD

Director, Office of Environmental Policy and Compliance, U.S. Department of the Interior

Director, Planning and Review, Advisory Council on Historic Preservation

Division Administrator, Federal Highway Administration (WA)

Environmental Protection Agency, Region 10, EIS Review Coordinator

National Marine Fisheries Service, Habitat Conservationists Division, Northwest Region

Natural Resources Conservation Service, National Environmental Coordinator, U.S. Department of Agriculture

NOAA Office of Policy and Strategic Planning, NEPA Coordinator

Northwest Mountain Region, Regional Administrator, Federal Aviation Administration

Northwest Power Planning Council

U.S. Army Engr. Northwestern Division

U.S. Coast Guard (USCG), Environmental Impact Branch, Marine Environmental and Protection Division

U.S. Department of Energy, Director, Office of NEPA Policy and Compliance

U.S. Department of the Interior, Office of Environmental Policy and Compliance

USDA, National Agricultural Library, Head, Acquisitions & Serials Branch

U.S. Fish and Wildlife Service

Bureau of Land Management

U.S. Navy Office of Chief of Naval Operations

## American Indian Tribes

Confederated Tribes of the Umatilla Reservation

Niimpuu (Nez Perce Tribe)

Confederated Tribes of the Warm Springs Reservation of OR

## Organizations

Adopt-A-Forest

Associated Oregon Loggers

Back Country Horsemen

Blue Mountains Audobon

Blue Mountains Biodiversity Project

Columbia River Inter-Tribal Fish Commission

Forest Service Employees for Environmental Ethics (FSEEE)

Hells Canyon Preservation Council

Lewis-Clark Valley Air Quality

Oregon Wild

Oregon Snowmobilers

Rocky Mountain Elk Foundation

Sierra Club, Oregon Chapter

Larry Pennington, Sierra Club Eastside Forest Committee

Mount Misery Snow Drifters

Northwest Trailbikers

Sierra Club Juniper Group

Dessert Rats

Lewis-Clark Valley Air Quality

Center for Tribal Water Advocacy

Oregon Natural Desert Association

Washington Wilderness Coalition

## Businesses

Associated Oregon Loggers Inc.

Boise Building, John Fullerton

Blue Mountain Lumber Products

Columbia Helicopter

East Oregonian Newspaper

Guy Bennett Lumber Company

Henderson Logging, Inc.

Joe Cook Logging

Pine Creek Logging

Ski Bluewood

Walla Walla Union Bulletin

Pendleton Record

LaGrande Observer

Healy Ranch LLC

## Individuals

Don Stroeber
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Jeremy Cox
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Glenn Warren
Mike Ziemantz
Tom Peterson
Brett Harting
Tom Wood
Chey Powelson

# GLOSSARY

## ABBREVIATIONS AND TERMS

**ASQ** Allowable Sale Quantity

**ATV** All Terrain Vehicle

**BA** Biological Assessment

**BE** Biological Evaluation

**BAER** Burned Area Emergency Response

**BMP** Best Management Practice

**BIO** Biological Opinion

**CCF** Hundred Cubic Feet

**CEQ** Council on Environmental Quality

**CFR** Code of Federal Regulations

**CTUIR** Confederated Tribes of the Umatilla Indian Reservation

**CY** Calendar year

**DBH** Diameter Breast Height

**DEIS** Draft Environmental Impact Statement

**DEQ** Department of Environmental Quality

**DFC** Desired Future Condition

**EA** Environmental Analysis

**EIS** Environmental Impact Statement

**EPA** Environmental Protection Agency

**ESA** Endangered Species Act

**ESD** Emergency Situation Declaration

**FR** Forest Road

**FEIS** Final Environment Impact Statement

**FSH** Forest Service Handbook

**FSM** Forest Service Manual

**FY** Fiscal Year

**GIS** Geographic Information System

**HFRA** Healthy Forest Restoration Act

**HRV** Historic Range of Variability

**HUC** Hydrologic Unit Code

**IDT** Interdisciplinary Team

**KV** Knutson Vandenberg Act

**LOS** Late Old Structure

**LRMP** Land and Resource Management Plan

**MA** Management Area

**MBF** Thousand Board Feet

**MIS** Management Indicator Species

**MMBF** Million Board Feet

**MOU** Memorandum of Understanding

**NEPA** National Environmental Policy Act

**NF** National Forest

**NFMA** National Forest Management Act

**NFS** National Forest System

**NMFS** National Marine Fisheries Service

**NOI** Notice of Intent

**PAG** Plant Association Group

**PVG** Potential Vegetation Group

**PWA** Potential Wilderness Area

**RD** Ranger District

**RHCA** Riparian Habitat Conservation Area

**RMO** Riparian Management Objective

**RNA** Research Natural Area

**ROD** Record of Decision

**S&G** Standard and Guideline

**SRI** Soil Resource Inventory

**TES** Threatened, Endangered or Sensitive

**TMDL** Total Maxim Daily Load

**UMA** Umatilla National Forest

**USFS** United States Forest Service

**USFWS** United States Fish and Wildlife Service

**VQO** Visual Quality Objective

**WDFW** Washington Department of Fish and Wildlife

# GLOSSARY

## A

**Activity fuels –** Fuels generated or altered by a management activity.

**Adfluvial individuals –** are those which emigrate as juveniles from spawning tributaries, maturing and overwintering in lakes and reservoirs.

**Affected environment** - Natural environment that exists at the present time in the area being analyzed.

**Afforestation –** The establishment of a forest or stand in an area where the preceding vegetation or land use was not forest.

**Age class** - A group of trees that started growing (regenerated) within the same time frame, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years.

**Air quality** – The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards" of maximum acceptable pollutant concentrations.

**Airshed** - A geographic area that, because of topography, meteorology, and climate, shares the same air.

**Allotment** (range allotment) - Area designated for use by a prescribed number of livestock for a prescribed time period.

**Alternative –** In an EIS, one of a number of possible options for responding to the purpose and need for action.

**Anadromous fish –** Fish that hatch in fresh water, migrate to the ocean, mature there, and return to fresh water to reproduce; for example, salmon and steelhead.

**Aspect** - The direction a surface faces. A hillside facing east has an eastern aspect.

**ASQ** (allowable sale quantity) - Amount of timber that may be sold within a certain period from an area of suitable land. The suitability of the land and the time period are specified in the Forest Plan.

## *B*

**Bankful width** – The width of a stream channel measured between the tops of the most prominent banks on either side of the stream. Also refers to the width of the stream at the normal flood flow.

**Basal area** - The area of the cross-section of a tree trunk near its base, usually 4 1/2 feet above the ground. Basal area is a way to measure how much of a site is occupied by trees. The term basal area is often used to describe the collective basal area of trees per acre.

**Benchmark –** The analytical basis from which the alternatives were developed; the use of assessed land capability as a basis from which to estimate the effects of alternative patterns of management on the land.

**Beneficial uses –** Any of the various uses which may be made of water including, but not limited to, domestic water supplies, industrial water supplies, agricultural water supplies, navigation, recreation in and on the water, wildlife habitat, and aesthetics. The beneficial use is dependent upon actual use, the ability of the water to support a non-existing use either now or in the future, and its likelihood of being used in a given manner. The use of water for the purpose of wastewater dilution or as a receiving water for a waste treatment facility effluent is not a beneficial use.

**Best Management Practices (BMPs) –** A practice or combination of practices that is the most effective and practical means (including technological, economic, and institutional considerations) of preventing or reducing negative environmental impacts to water pollution.that may result from resource management activities.

**Big game -** Large mammals, such as deer and elk, that are hunted for sport.

**Big game summer range –** A range usually at higher elevations, used by deer and elk during the summer. Summer ranges are usually much more extensive than winter ranges.

**Big game winter range** – A range usually at lower elevation used by migratory deer and elk during the winter months; usually more clearly defined and smaller than summer range.

**Bioenergy –** Energy derived from fuel, such as wood or ethanol, derived from biomass.

**Biological diversity** - The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and ecological processes that connect everything in a common environment.

**Biological Assessment (BA) –** A document prepared by a federal agency for the purpose of identifying any endangered or threatened species that is likely to be affected by an agency action. This document facilitates compliance with the Endangered Species Act.

**Biophysical** – The combination of biological and physical components in an ecosystem.

**Board foot (bf) -** A measurement term for lumber or timber. It is the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide. Often expressed as MBF (thousand board feet) or MMBF (million board feet).

**Broadcast burn -** A prescribed fire that burns forest fuels as they are, with no piling or windrowing.

**Browse -** Twigs, leaves, and young shoots of trees and shrubs that animals (such as deer and elk) eat.

**Buffer** - A land area designated to block or absorb impacts to the area beyond the buffer. For example, a streamside buffer is often retained to reduce impacts of a harvest unit.

## C

**Canopy -** In a forest, the branches of the uppermost layer of foliage. It can also be used to describe lower layers in a multistoried forest.

**Canopy closure** – The amount of ground surface shaded by tree canopies as seen from above. Used to describe how open or dense a stand of trees is, often expressed in 10 percent increments.

**Capability –** The potential of an area or land/water to produce resources, supply goods and service, and allow resource uses under a specified set of management practices and at a given level of management intensity.

**Catastrophic wildfire –** An especially intense and widespread fire that usually, but not always, occurs in forests that are outside the historical range of variability in terms of forest structure and forest fuels due to fire suppression.

**Classified road –** See Road Definitions.

**Cavity -** A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

**CCF -** One hundred cubic feet (see CF).

**CF -** A measurement term for lumber or timber. It is the amount of wood contained in an unfinished block of wood 12 inches thick, 12 inches long, and 12 inches wide. Often expressed as CCF (hundred cubic feet).

CFR – Code of Federal Regulations. A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the federal government.

**Channel (stream) –** The deepest part of a stream or riverbed through which the main current of water flows.

**Channelization** - Human-caused alterations to a stream channel that cause the channel to be fixed in place, such as levees, dikes, trenching, and riprap.

**Climax -** The culminating seral stage in plant succession for any given site where, in the absence of high-severity disturbances, the vegetation has reached a highly stable condition and undergoes change very slowly. A self-replacing community that is relatively stable over several generations of the dominant plant species, or very persistent in comparison to other seral stages.

**Clearcutting** - A regeneration harvest method that removes all merchantable trees in a single cutting except for wildlife trees or snags. A "clearcut" is an area from which all merchantable trees have been cut.

**Closed system road** – Classified system road closed to public use. Opened to administrative use. Not decommissioned.

**Commercial thinning –** Thinning where the trees being removed are large enough to have economic value and can be sold to a timber purchaser.

**Community -** A group of species of plants or animals living and interacting at a particular time and place; a group of people residing in the same place under the same government.

**Compaction –** Making soil hard and dense, decreasing its ability to support vegetation because the soil can hold less water and air and because roots have trouble penetrating the soil.

**Conifer** - A tree that produces cones, such as a pine, spruce, or fir tree.

**Consultation –** A process required by Section 7 of the Endangered Species Act whereby federal agencies proposing activities in a listed species habitat confer with governing agencies about the impacts of the activity on the species. Consultation may be informal, and thus advisory, or formal, and thus binding.

**Connectivity** (of habitats) - The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by

corridors of appropriate vegetation. The opposite of fragmentation.

**Corridor -** Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows where wildlife feed.

**Cover** - Any feature that conceals wildlife or fish, sometimes referred to as "hiding cover." Cover may be dead or live vegetation, boulders, or undercut stream banks. Animals use cover to escape from predators, rest, or feed.

**Cover deficient area –** Any forage area greater than 600 feet from the defined forage: cover edge.

**Cover forage ratio** - The ratio of hiding cover to foraging areas for wildlife species. Necessary in determining the effectiveness of the habitat an area provides.

**Critical habitat** - Areas designated for the survival and recovery of federally listed threatened or endangered species.

**Crown -** The part of a tree containing life foliage; treetops.

**Crown fire –** A forest fire that advances through the crown fuel layer normally in direct conjunction with a surface fire.

**Cultural resource -** The remains of sites, structures, or objects used by people in the past (at least 50 years old); this can be prehistoric or historical.

**Cumulative effects -** Effects on the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

## *D*

**DBH** (diameter at breast height) - The diameter of a tree 4 1/2 feet above the ground measured on the uphill side of the tree.

**Danger Tree –** A hazard tree is considered to be any tree that is likely to fail within one and one-half tree lengths of an open class 3 or higher system road, any road designated for hauling, developed recreation or administrative site."

**DecAid –** An advisory tool that provides guidance to land managers evaluating effects of forest conditions and existing or proposed management activities on organisms that use snags, downwood, and other wood decay elements. DecAid is a statistical summary of empirical data from published research on wildlife and deadwood. Data provided in DecAid allows the user to relate the abundance of deadwood habitat for both snags and logs to the frequency of occurrence of selected wildlife species that require dead wood habitat for some part of their life cycle.

**Decommission –** Activity that results in the stabilization and restoration of unneeded roads to a more natural state. Removes the road segment from the Forest road inventory system. Decommissioning can involve: closing entrances; scarifying road surfaces, or decompacting (sub-soiling) to establish vegetation and reduce run-off.; seeding to control erosion; partial to full restoration of stream channel by removing culverts and fills; and removing unstable portions of embankments.

**Deforestation** – The removal of a forest stand where the land is put to a non-forest use.

**Desired future condition -** A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

**Direct effects –** Impacts on the environment that are caused by the action and occur at the same time and place.

**Disturbance -** Any event, such as flood, wildfire, insect infestations, or timber harvest, that alters the structure, composition, or functions of terrestrial or aquatic habitats.

**Diversity -** The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

**Duff –** Organic matter in various stages of decomposition on the floor of the forest.

## *E*

**Early forest succession -** The stage of vegetation or wildlife that inhabits an area immediately following removal or destruction of vegetation. For instance, grasses may be the first plants to grow in an area that was burned.

**Eastside Screens –** Regional Foresters's Forest Plan Amendment (June 1995) designed to maintain options for old growth related and other species.

**Ecological approach** - An approach to natural resource management that considers the relationships among all organisms, including humans, and their environment.

**Ecology** - The interrelationships of living things to one another and their environment or the study of these interrelationships. From the Greek Oikos meaning "house" or "place to live."

**Ecological integrity** – In general, ecological or biological integrity refers to the elements of biodiversity and the functions that link them together and sustain the entire system; the quality of being complete; a sense of wholeness. Absolute measures of integrity do not exist. Proxies provide useful measures to estimate the integrity of major ecosystem components (forestland, rangeland, aquatic, and hydrologic). Estimating these integrity components in a relative sense across the project area helps to explain current conditions and to prioritize future management. Thus areas of high integrity would represent areas where ecological functions and processes are better represented and functioning than areas rated as low integrity.

**Ecosystem** - A complete interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

**Ecosystem health** – A condition where the parts and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, such that goals for uses, values, and services of the ecosystem are met.

**Ecosystem-based management** – Scientifically based land and resource management that integrates ecological capabilities with social values and economic relationships, to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term.

**Edge** (habitat) - The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand or a ponderosa pine stand next to an aspen stand.

**Endangered species** - A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance

with the Endangered Species Act of 1973.

**Environmental analysis** - An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, social, and economic factors.

**Environmental Impact Statement (EIS)** - A statement of environmental effects of a proposed action and alternatives. The Draft EIS is released to other agencies and the public for comment and review. A Final EIS is issued after consideration of Public and agency comments. A Record of Decision (ROD) is based on the information and analysis in the Final EIS.

**Ephemeral streams** - Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.

**Erosion** - The wearing away of the land surface by wind, water, ice, gravity, or other geological activities. Erosion can be intensified by human activities (such as road building) that may reduce the stability of soils or slopes.

**ETA – Equivalent Treatment Acres** –is a watershed cumulative effects model that calculates the acres of created openings in forested areas based on harvest prescription or other mortality. It is used as an index to represent the potential for increased water yield and peak flows as a consequence of reducing water loss by interception and evapotranspiration, or by changing snow distribution and melt rates.

**Even-aged management** - Method of forest management in which trees, usually the same species, are maintained at the same age and size and harvested all at once so a new stand may grow.

**Even-aged stands** – Stands of trees of approximately the same age. Silvicultural methods that generate even-aged stands include clearcutting, shelterwood, and seed tree.

**Exotic -** A plant or animal species introduced from a distant area; not native to the area, often particularly aggressive.

**Extirpation –** Localized disappearance of a species from an area.

## F

**Fauna -** The vertebrate and invertebrate animals of an area or region.

**Fine fuels** – Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than ¼ -inch in diameter and have a time lag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

**Fire behavior –** How fire reacts to the influences of fuel, weather, and topography.

**Fire cycle** (mean fire interval) **-** The average time between fires in a given area.

**Fire-dependent -** Forests, grasslands, and other ecosystems historically composed of species that evolved with and are maintained by periodic fire.

**Fire-intolerant** – Species of plants that do not grow well or die from the effects of too much fire. Generally these are shade-tolerant species.

**Fire regimes** – The ecological effects of frequency, intensity, extent, season, and synergistic interactions with other disturbances, such as insects and disease, classified into generalized levels of fire severity.

**Fire severity or Burn severity** –Severity describes the fire-caused damage to the soil. The severity ratings (high, moderate, and low) are based on standards in Forest Service Handbook 2509.13.

**Fire-tolerant** – Species of plants that can withstand certain frequency and intensity of fire. Generally these are shade–intolerant species.

**First-order stream** – Stream channel with no tributaries.

**Fisheries habitat -** Streams, lakes, and reservoirs that support fish or have the potential for supporting fish.

**Flood plain -** The portion of a river valley or level lowland next to streams which is covered with water when the river or stream overflows its bank at flood stage.

**Flora -** The vegetation of an area.

**Fluvial individuals –** are those which emigrate as juveniles from spawning tributaries, maturing and overwintering in large rivers.

**Forage -** Vegetation (both woody and non-woody) eaten by animals, especially big game and livestock.

**Forage area –** All areas that do not meet the definition of either satisfactory cover or marginal cover.

**Forage deficient area –** Any total cover farther than 600 feet from the defined forage: cover edge.

**Forb -** A broadleaf plant that has little or no woody material in it, including plants commonly called wildflowers and weeds.

**Foreground -** The part of a scene or landscape that is nearest the viewer.

**Forest health** – The condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity while providing for human needs and values. It is a useful way to communicate about the current condition of the forest, especially with regard to resiliency, a part of forest health that describes the ability of the ecosystem to respond to disturbances. Forest health and resiliency can be described, in part, by species composition, density, and structure.

**Forest plan (Umatilla Land and Resource Management Plan) –** A document that guides natural resource management and establishes standards and guidelines for a National Forest; required by the National Forest Management Act.

**Forest road or trail -** A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

**Forest transportation atlas –** A display of the system of roads, trails, and airfields of an administrative unit.

**Fragmentation -** The breakup of a large land area (such as a forest) into smaller patches that are isolated from the original area. Fragmentation can occur naturally (as by stand-replacing wildfire) or from human activities (such as road building).

**Fuel(s) –** Combustible material that includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees. Includes both living plants; dead, woody vegetative materials; and other vegetative materials which are capable of burning.

**Fuel break –** A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against a wildfire. Fuel breaks are designated or constructed before the outbreak of a fire. Fuel breaks may consist of one or a combination of the following: natural barriers, constructed fuel breaks, man-made barriers.

**Fuel ladder -** Shrubs, small trees, and low growing branches that allow fire to move from the ground to the tree crowns.

**Fuel load** – The dry weight of combustible materials per unit area; usually expressed as tons per acre.

**Fuels management -** The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfirein the area would be explosive and impossible to control.

**Function -** The processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle.

## *G*

**Geographic Information System (GIS) –** Computer software that provides database and spatial analytic capabilities.

**Geomorphic processes -** Processes that change the form of the earth, such as volcanic activity, running water, and glacial action.

**Geomorphology -** The geologic study of the shape and evolution of the earth's landforms.

**Ground fire -** A fire that burns along the forest floor and does not affect trees with thick bark or high crowns.

**Ground fuels –** All combustible materials below the surface litter layer. These fuels may be partially decomposed, such as forest soil organic layers (duff), dead moss and lichen layers, punky wood and deep organic layers (peat), or may be living plant material, such as tree and shrub roots.

**Groundwater -** Water that sinks into the soil and is stored in slowly flowing and slowly renewed underground reservoirs called aquifers.

## *H*

**Habitat** - The place where a plant or animal finds what it needs to survive, either year-round or seasonally.

**Habitat capability** - The ability of a habitat to support a given species of wildlife.

**Habitat diversity** - The variety of different types of wildlife habitat within a given area.

**Habitat type** - A way of defining land areas potentially capable of producing similar plant communities at climax. In Forestry, habitat types are named for the predominant climax tree species. For example,the Pinus Ponderosa habitat type series is habitat that typically supports climax Ponderosa Pine. A number of other habitat features can be identified using habitat types, such as aspect, elevation, climate, and use by wildlife species.

**Harvest –** (1) Felling and removal of trees from the forest; (2) removal of game animals or fish from a population, typically by hunting or fishing.

**Headwaters** – Beginning of a watershed; unbranched tributaries of a stream.

**Hiding area/cover** - Vegetation capable of hiding 90 percent of an adult elk or deer from a human's view at a distance of 200 feet or less.

**Historical Range of Variability (HRV)** – The natural fluctuation of components of healthy ecosystems over time. In this EIS, it refers to the range of conditions and processes that are likely to have occurred prior to settlement of the project area by people of European descent (approximately the mid 1800s), which would have varied within certain limits over time.

**Hydrologic Unit Code (HUC) –** An area of land upstream from a specific point on a stream (designated as the mouth) that defines a hydrologic boundary and includes all of the source areas that could contribute surface water runoff directly and indirectly to the designated outlet point.

**Hydrology** - The study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

## *I*

**Indicator species** - A plant or animal species that is presumed to be sensitive to habitat change. Its presence indicates specific habitat conditions are also present. Population changes in an indicator

species can indicate the effects of land management activities.

**Indirect effects** – Impacts on the environment that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

**Individual tree selection** - The removal of certain size and age classes of individual trees from a stand. Regeneration is allowed to naturally occur and an uneven-aged stand is maintained.

**Instream flow** - The natural flow of water in a stream channel.

**Intensity (fire intensity)** - The rate of heat release for an entire fire at a specific time.

**Interdisciplinary team (IDT)** - A team of individuals with skills from different disciplines that focuses on the same task or project, referred to as ID Team.

**Intermediate harvest** - The removal of trees from a stand between the time of its formation and harvest cutting. Thinning, liberation, and improvement cuts are all types of intermediate harvest. Sometimes salvage harvests and sanitation harvests are termed intermediate.

**Intermittent stream** - A stream that flows only at certain times of the year when it receives water from streams or some surface source, such as melting snow.

**Irretrievable** – A category of impacts that applies to losses of production or commitment of renewable natural resources.

**Irreversible** – A category of impacts that applies to non-renewable resources, such as minerals and archaeological sites. Losses of these resources cannot be reversed. Irreversible effects can also refer to effects of actions on resources that can be renewed only after a very long period of time, such as the loss of soil productivity.

**Issue –** A matter of controversy, dispute, or general concern over resource management activities or land uses. To be considered a “significant “ EIS issue, it must be well defined, relevant to the proposed action, and within the ability of the agency to address through alternative management strategies.

## *L*

**Ladder fuels –** Fuels which provide vertical continuity between strata. Fire is able to carry from the surface fuels by convection into the crowns with relative ease.

**Landing -** Any place where cut timber is collected before further transport from the timber sale area.

**Landscape -** All the natural features such as grasslands, hills, forest, and water, which distinguish one part of the earth's surface from another; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

**Late forest succession -** The stage of forest succession in which most of the trees are mature or overmature.

**Lethal fire (stand replacement) -** Fire that kills upwards of 70 percent of overstory trees.

**Litter (forest litter) -** The freshly fallen or only slightly decomposed plant material on the forest floor. This layer includes foliage, bark fragments, twigs, flowers, and fruit.

## *M*

**Mainstem** – The main channel of the river in a river basin, as opposed to the streams and smaller rivers that feed into it.

**Management action** - Any activity undertaken as part of the administration of the National Forest.

**Management area –** An aggregation of capability areas that have a common management direction, and may be dispersed over the Forest.

**Marginal cover –** A stand of coniferous trees 10 or more feet tall with an average canopy closure equal to or more than 40 percent but less than 70 percent and generally capable of obscuring at least 90 percent of a standing elk from the view of humans at a distance of 200 feet..

**Merchantable timber -** Timber that can be bought or sold.

**Middleground –** A term used in visual management to describe the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer.

**MIS (management indicator species)** - A wildlife species selected by a land management agency to indicate the health of the ecosystem in which it lives and, consequently, the effects of forest management activities on that ecosystem (see "indicator species").

**Mitigation -** Measures designed to counteract environmental impacts or make impacts less severe.

**Mixed stand -** A stand consisting of two or more tree species.

**MBF -** Thousand Board Feet (see board foot).

**MMBF** - Million Board Feet (see board foot).

**Modification-** Human activity may dominate the characteristic landscape, but at some time follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middle ground.

**Monitoring** - A process of collecting information to evaluate whether or not objectives of a project and its mitigation activities are being realized.

**Mortality** - The loss of a population due to all lethal causes, often referring to the rate of death of a species in a given population or community.

**Mosaic** - A pattern of vegetation in which two or more kinds of plant communities are interspersed in patches, such as a meadow between stands of old growth.

**Motor Vehicle –** Any vehicle which is self propelled, other than: (1) a vehicle operated on rails, and (2) Any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.

**Multiple-use management** – The management of public lands and their various resource values so they are used in the combination that best meets the present and future needs of the American people.

**Mycorrhizae** - The symbiotic relationship between certain fungi and the roots of certain plants; important for plants to take nutrients from soil.

## *N*

**National Forest System Road -** A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority.

**Natural regeneration –** Reforestation of a site by natural seeding from surrounding trees. Natural regeneration may or may not be preceded by site preparation.

**Natural resource -** Water, soil, wild plants and animals, air, minerals, nutrients, and other resources produced by the earth's natural processes.

**NEPA (National Environmental Policy Act) -** An act of Congress passed in 1969 declaring a national policy to encourage productive and enjoyable harmony between people and their environment. Section 102 of the NEPA requires a statement of possible environmental effects be released to

the public and other agencies for review and comment.

**NFMA (National Forest Management Act) -** A law passed in 1976 requiring the preparation of Regional Guides and Forest Plans and regulations to guide that development.

**No Action alternative** - The most likely condition expected to exist in the future if management practices continue unchanged.

**Non-Commercial Thinning -** – Thinning where trees are too small to be sold for conventional products.

**Non-game** – Term for wild animals not commonly harvested for recreation, fur or subsistence.

**Non-point source pollution** - Pollution whose source is not specific in location. The sources of the discharge are dispersed, not well defined, or constant. Examples include sediments from logging activity and runoff with chemicals from agricultural lands.

**Non-system road/unclassified road –** Any continuous set of wheel tracks that exist for more than one season, and does not belong to the transportation system.

**Noxious weed** - A weed that causes disease or has other adverse effects on man or his environment and, therefore, is detrimental to public health and the agriculture and commerce of the United States. Noxious weeds are often aggressive and difficult to manage and non-native, new, or not common to the United States.

**Nutrient cycle** - Ecological processes in which nutrients and elements such as carbon, phosphorous, nitrogen, calcium, and others circulate among animals, plants, soils, and air.

## O

**Old growth** - Old forests often containing several canopy layers, variety in tree sizes and species, decadent old trees, and standing and dead woody material.

**Ongoing actions** – Actions that have been implemented, or have contracts awarded or permits issued.

**Open system road –** Classified system road, open to public use.

**Optimum cover –** Any total cover within 600 feet of the defined forage:cover edge.

**Optimum forage –** Forage area within 600 feet of the defined forage: cover edge.

**Overmature timber** - Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.

**Overstory** - The upper canopy layer; the plants below comprise the understory.

## P

**PACFISH** – Interim strategies for managing Pacific anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California.

**Park-like structure** - Stands with large scattered trees, few or no understory trees, and open growing conditions, usually maintained by frequent ground fires.

**Partial Retention-** Human activity may dominate the characteristic landscape, but must at some time follow naturally established form, line, color, and texture. It should remain visibly subordinate when viewed in foreground or middle ground.

**Patch** - An area of uniform vegetation that differs in structure and composition from what surrounds it.

**Perennial stream** - A stream that flows throughout the year from its source to mouth.

**Plant Association -** A taxonomic unit in a potential vegetation classification system. A plant association consists of plant communities with similar form and structure and plant composition; commonly it is a climax community.

**Plant Association Group (PAG)—**Groupings of plant associations (and other taxonomic units classified as potential vegetation types), representing similar ecological environments as characterized by temperature and moisture regimes.

**Plant Community Type (PCT) -** In a potential vegetation classification context, plant community type is a taxonomic unit with no particular successional status implied.

**Predator** - An animal that captures and feeds on parts or all of an organism of another species.

**Preferred alternative** – The alternative identified in a draft environmental impact statement which has been initially selected by the agency as the most acceptable resolution to the problems identified in the purpose and need.

**Prescribed fire** - The intentional use of fire under specified conditions to achieve specific management objectives.

**Prescription** – Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, and environmental, geographic, administrative, social, or legal considerations.

**Present net value (PNV)** [also called present net worth] - The measure of the economic value of a project when costs and revenues occur at different times. Future revenues and costs are "discounted " to the present by an interest rate that reflects the changing value of a dollar over time. The assumption is that dollars today are more valuable than dollars in the future. PNV is used to compare project alternatives that have different cost and revenue flows.

**Public involvement** - The use of appropriate procedures to inform the public, obtain early and continuing public participation, and consider the views of interested parties in planning and decision making.

## *R*

**Range of variability** - The fluctuation, over time, in the population, size, and components of healthy ecosystems.

**Rangeland (range)** - Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

**Redd** –Spawning nest made by salmon or steelhead in the gravel bed of a river.

**Reforestation** - The restocking of an area with forest trees by either natural or artificial means such as planting.

**Regeneration** - The process of establishing a new tree crop on previously harvested land. The term also refers to the young crop itself.

**Regeneration harvest** - A silvicultural treatment intended to regenerate a stand of trees. Shelterwood and seed tree harvests are forms of regeneration treatments.

**Resident fish** – Fish that spend their entire life in freshwater: examples include bull trout and westslope cutthroat trout.

**Resilient, resiliency** - The capacity of a plant community or ecosystem to maintain or regain normal function and development following disturbance.

**Restoration (of ecosystems)** - Actions taken to modify an ecosystem to achieve a desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume its resiliency to disturbances.

**Retention**- Human activities are not evident to the casual forest visitor.

**Revegetation** - Establishing or reestablishing desirable plants on a site where they are absent or in few numbers. Revegetation can be accomplished through natural or artificial reseeding or transplanting.

**Riparian area** - The area along a watercourse or around a lake or pond. Area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

**Riparian ecosystem** - The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

**Riparian Habitat Conservation Area (RHCA) –** Portions of watershed where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris and nutrient delivery systems.

**Riparian Management Objectives (RMO) –** Quantifiable measures of stream and stream-side conditions that define good anadromous fish habitat, and serve as indicators against which attainment, or progress toward attainment, of the goals will be measured.

**Road –** A motor vehicle route over 50 inches wide, unless identified and managed as a trail.

**Runoff -** The portion of precipitation that flows over the land surface or in open channels.

## S

**Salvage –** Salvage timber harvest is defined as "the removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost" (Helms 1998). When a fire front passes a tree, some of the resulting heat is transferred to the vascular cambium, foliage and roots. If the temperatures are high enough and the flame residence time is long enough, these tissues are killed. When a high proportion of the cambium, crown or fine roots are killed, the whole tree dies. Lower temperatures or shorter residence times will injure tissues rather than kill them (Dickinson and Johnson 2001).

**Satisfactory cover –** A stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or more than 70 percent. Umatilla Forest Plan defines it as cover used by animals to ameliorate the effect of weather.

**Scoping** - The early stages of preparation of an environmental analysis to determine public opinion, receive comments and suggestions, and determine issues during the environmental analysis process. It may involve public meetings, telephone conversations, or letters.

**Seasonally Closed Road** – Classified system road closed to public use for part of the year.

**Sediment –** Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle to the bottom.

**Sensitive species** - A sensitive species is one that has been designated by the Regional Forester because of concern for population viability. Indications for concern include significant current or predicted downward trends in population numbers or density or in habitat capability that would reduce an existing species distribution.

**Seral** - Refers to the sequence of transitional plant communities during succession. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid-seral in a forest would refer to pole or medium saw timber growth stages; late or old seral refers to plants present during a later stage of plant community succession (such as mature or old forest stages).

**Shade-intolerant species** - Species of plants that do not grow well in the shade of others. They are species that develop on a site soon after a major disturbance. Ponderosa pine and western larch are

shade-intolerant tree species.

**Shade-tolerant species** - Species of plants that grow well in the shade of others. Grand fir is a relatively shade-tolerant tree species.

**Shelterwood harvest** - A regeneration cut designed to establish a new crop of trees under the protection of the old. This type of harvest typically occurs in stages with a second entry following the first after regeneration has occurred.

**Silvicultural system** - The cultivation of forests; the result is a forest of a distinct form. Silvicultural systems are classified according to harvest and regeneration methods and the type of forest that results.

**Silviculture** - The practice of manipulating the establishment, composition, structure, growth, and rate of succession of forests to accomplish specific objectives.

**Site potential** – A measure of resource availability based on interactions among soils, climate, hydrology, and vegetation.

**Site preparation** - The general term for removing unwanted vegetation, slash, roots, and stones from a site before reforestation. Naturally-occurring wildfire as well as prescribed fire can prepare asite for natural regeneration.

**Slash** - The residue left on the ground after timber cutting or after a storm, fire, or other event. Slash includes unused logs, uprooted stumps, broken or uprooted stems, branches, bark, etc.

**Smolt –** Young salmon or trout migrating to the ocean and undergoing biological changes to enable them to move from freshwater streams to saltwater.

**Snag** - A standing dead tree.

**Soil compaction** - The reduction of soil volume. For instance, the weight of heavy equipment on soils can compact the soil and thereby change it in some ways, such as in its ability to absorb water.

**Soil productivity** - The capacity of a soil to produce a specific crop. Productivity depends on adequate moisture and soil nutrients as well as favorable climate.

**Soil Resource Inventory (SRI) –** An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

**Spawning habitat** – Areas used by adult fish for laying and fertilizing eggs.

**Special use permit** - A permit issued to an individual or group by the USDA Forest Service for use of National Forest land for a special purpose. Examples might be a special use permit for the Boy Scout Jamboree or a mountain bike race.

**Species** – A population or series of populations of organisms that can interbreed freely with each other but not with members of other species.

**Stability** – Ability of a living system to withstand or recover from externally imposed changes or stresses.

**Stand** - A group of trees in a specific area that are sufficiently alike in composition, age, arrangement, and condition so as to be distinguishable from the forest in adjoining areas.

**Stand composition** – The vegetative species that make up the stand.

**Stand density** – Refers to the number of trees growing in a given area, usually expressed in trees per acre.

**Stand structure** –The mix and distribution of tree sizes, layers, and ages in a forest. Some stands are all one size (single-story), some are two-story, and some are a mix of trees of different ages and sizes (multi-story).

**Standards and guidelines** - Requirements found in a Forest Plan which impose limits on natural resource management activities, generally for environmental protection.

**Stream morphology** – The study of the form and structure of streams.

**Strongholds (fish**) – Watersheds that have the following characteristics: (1) presence of all major life-history forms (for example, resident, fluvial, and adfluvial) that historically occurred within the watershed; (2) numbers are stable or increasing, and the local population is likely to be at half or more of its historical size or density; (3) the population or metapopulation within the watershed, or within a larger region of which the watershed is a part, probably contains at least 5,000 individuals or 500 adults.

**Succession** – The process by which a series of different plant communities successively occupy and replace each other over time in a particular ecosystem or landscape location following a disturbance event. Succession refers to the process of development of an ecosystem over time. The different stages in succession are often referred to as seral stages (see "seral").

**Successional stage -** A stage of development of a plant community as it moves from bare ground to climax. The grass-forb stage of succession precedes the woody shrub stage (see "seral").

**Suitability -** The appropriateness of certain resource management practices for an area of land. Suitability can be determined by environmental and economic analysis of management practices.

**Supplemental Environmental Impact Statement (SEIS) -** A supplementary statement of environmental effects of a proposed action and alternatives. A SEIS is prepared when new relevant information comes to light after the issuance of a Final EIS. The Draft SEIS is released to other agencies and the public for comment and review. A Final SEIS is issued after consideration of Public and agency comments. A Record of Decision (ROD) is based on the information and analysis in the Final SEIS.

**Sustainability** – (1) Meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land. (2) In commodity production, refers to the yield of a natural resource that can be produced continually at a given intensity of management.

## *T*

**Thermal cover -** Cover used by animals against weather. For example, thermal cover for elk can be found in a stand of coniferous trees at least 40 feet tall with a crown closure of at least 70 percent.

**Thinning** - An intermediate cutting method designed to reduce stand density in order to improve growth of the residual trees, enhance forest health, or recover potential mortality resulting from inter-tree competition.

**Threatened species** - Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the US Fish and Wildlife Service under the Endangered Species Act of 1973.

**Tiering** – In an EIS, refers to incorporating by reference the analyses in an EIS of a broader scope. For example, a Forest Service project-level EIS could tier to the analysis in a Forest Plan EIS; a Forest Plan EIS could tier to a Regional Guide EIS.

**Total cover –** All coniferous tree cover 10 or more feet tall and with a canopy closure of equal to or greater than 40 percent (i.e. satisfactory cover plus marginal cover),

**Tractor logging** - A logging method that uses tractors to carry or drag logs from the stump to a landing.

**Trail –** A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.

## *U*

**Unauthorized road or trail –** A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas.

**Unauthorized or Temporary Road –** Formerly also referred to as unclassified road. These are defined as Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned traveled way, and off-road vehicle track that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization. Roads not authorized or necessary for long-term resource management.

**Underburn** - A burn by a surface fire that can consume ground vegetation and ladder fuels.

**Understory** - The trees and woody shrubs growing beneath the overstory.

**Uneven-aged management** - Method of forest management in which trees of different species in a given stand are maintained at many ages and sizes to permit continuous natural regeneration. Selective cutting is one example of an uneven-aged management method.

**Uneven-aged stand** – Stand of trees in which there are considerable differences in the ages of individual trees.

**Unsuitable lands** - Forest land that is not managed for timber production. Reasons may be matters of policy, ecology, technology, silviculture, or economics.

## *V*

**Vegetation management** - Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.

**Vertical diversity** - The diversity in a stand that results from the different layers or tiers of vegetation.

**Viable population** - The number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations that are adequately distributed throughout

their range.

**Visual quality objective (VQO)** - A set of measurable goals for the management of forest visual resources.

## *W*

**Water yield** - The runoff from a watershed including groundwater outflow.

**Watershed** - The entire region drained by a waterway (or into a lake or reservoir). More specifically, a watershed is an area of land above a given point on a stream that contributes water to the stream flow at that point.

**Wetlands** - Areas that are permanently wet or intermittently covered with water. Wetlands generally include swamps, bogs, seeps, wet meadows, and natural ponds.

**Wildland Urban Interface (WUI) –** Includes those areas of resident human population at imminent risk from wildfire, and human developments having special significance. These areas may include critical communication sites, municipal watershed, high voltage transmission lines, observatories, church camps, scout camps, research facilities, and other structures that if destroyed by fire, would result in hardships to communities. These areas encompass not only the sites themselves, but also the continuous slopes and fuels that lead directly to the sites, regardless of the distance involved.

**Wildfire** - A human or naturally caused wildland fire that does not meet land management objectives.

**Wildlife habitat diversity** - The distribution and abundance of different plant and animal communities and species within a specific area.

**Windthrow** - Trees blown over by the wind.

**Winter range** - That portion of big game's range where animals congregate for the winter.

## *X, Y, Z*

**Yarding –** Hauling timber from the stump to a collection point.

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## H



## I

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This appendix applies the integrated approach to scenery management that is key to the intent of the SMS Handbook.

# APPENDIX A

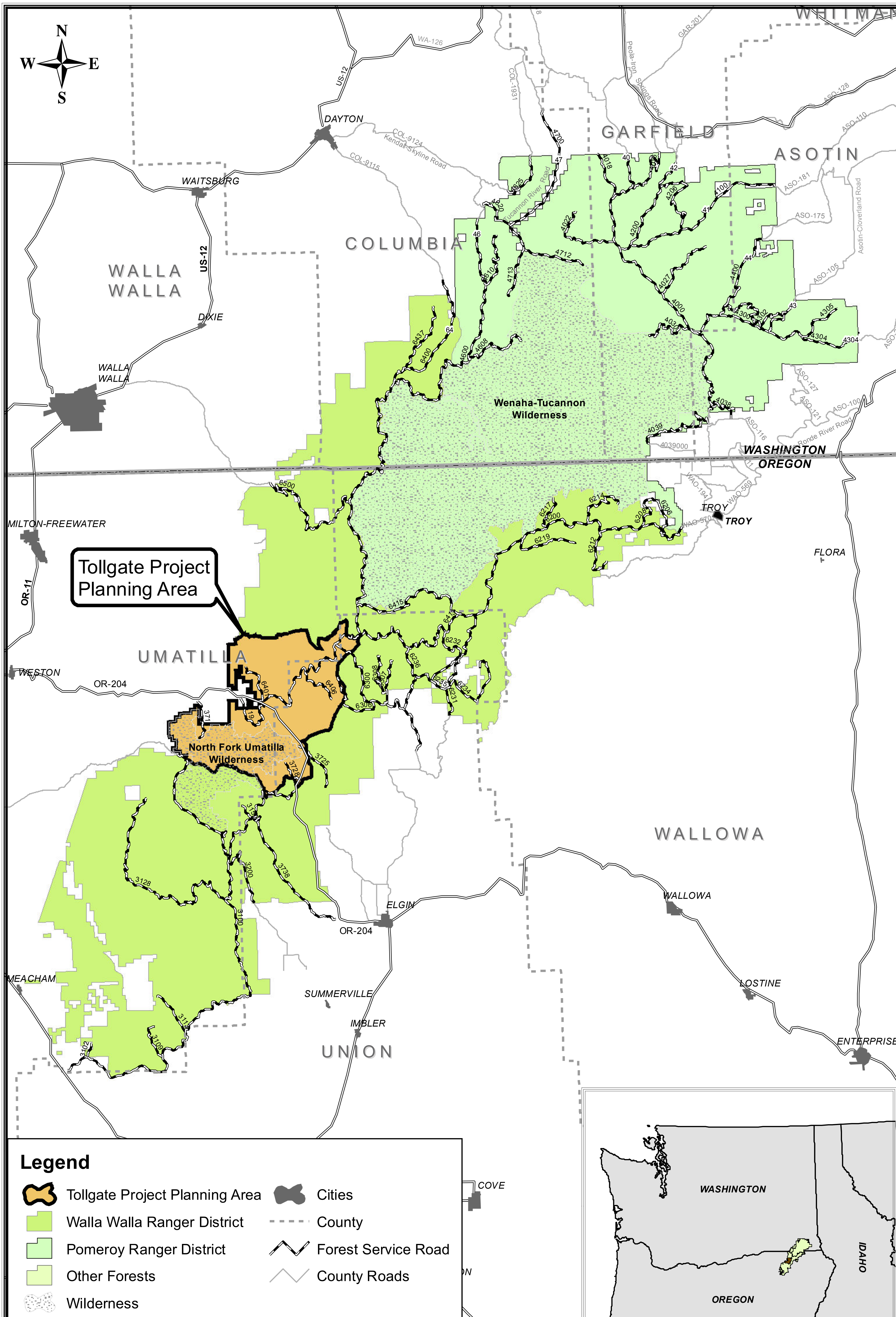
## MAPS

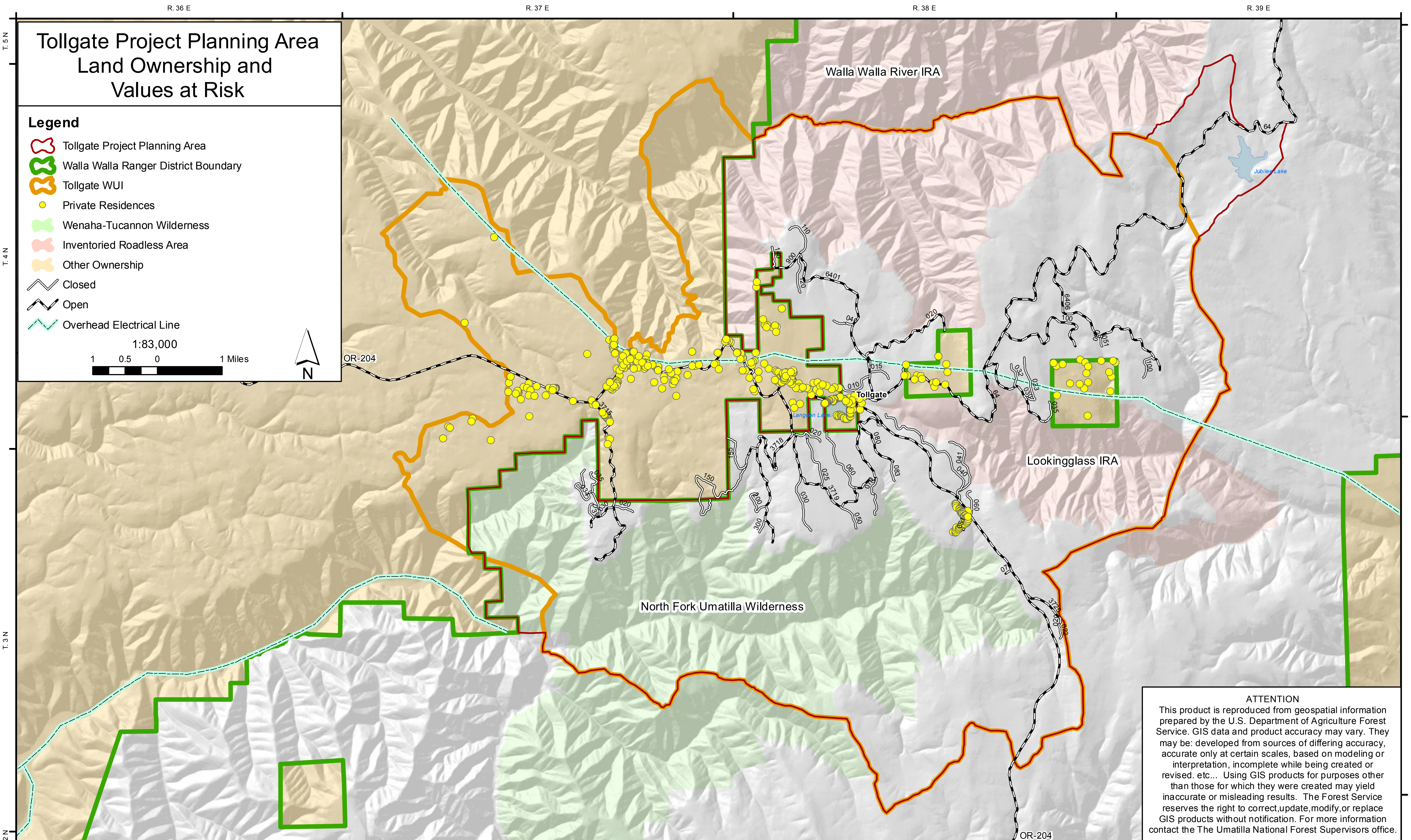
# APPENDIX A

An index of the maps included in this appendix is listed below.

## Index of Maps

# Tollgate Project Planning Area
# Vicinity Map





R. 36 E
R. 37 E
R. 38 E
R. 39 E
T. 5 N
T. 4 N
T. 3 N
T. 2 N
Tollgate Project Planning Area
Land Ownership and
Values at Risk
Legend
Tollgate Project Planning Area
Walla Walla Ranger District Boundary
Tollgate WUI
Private Residences
Wenaha-Tucannon Wilderness
Inventoried Roadless Area
Other Ownership
Closed
Open
Overhead Electrical Line
1:83,000
1 0.5 0 1 Miles
N
Walla Walla River IRA
Jubilee Lake
OR-204
Tollgate
Langdon Lake
Lookingglass IRA
North Fork Umatilla Wilderness
ATTENTION
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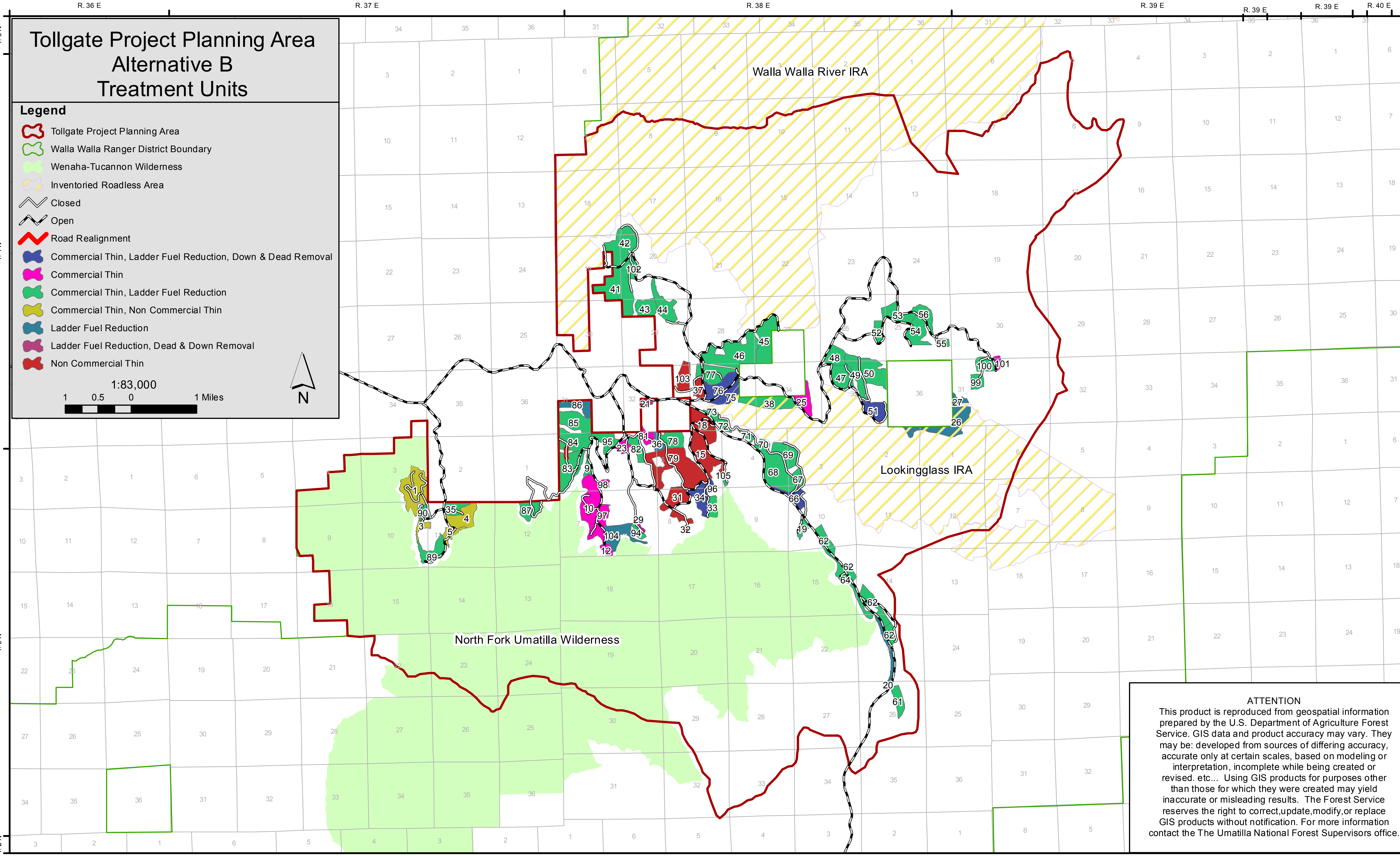
Tollgate Project Planning Area
Alternative B
Treatment Units
Legend
Tollgate Project Planning Area
Walla Walla Ranger District Boundary
Wenaha-Tucannon Wilderness
Inventoried Roadless Area
Closed
Open
Road Realignment
Commercial Thin, Ladder Fuel Reduction, Down & Dead Removal
Commercial Thin
Commercial Thin, Ladder Fuel Reduction
Commercial Thin, Non Commercial Thin
Ladder Fuel Reduction
Ladder Fuel Reduction, Dead & Down Removal
Non Commercial Thin
1:83,000
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R. 36 E
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R. 39 E
R. 40 E
T. 5 N
T. 4 N
T. 3 N
T. 2 N
Walla Walla River IRA
Lookingglass IRA
North Fork Umatilla Wilderness
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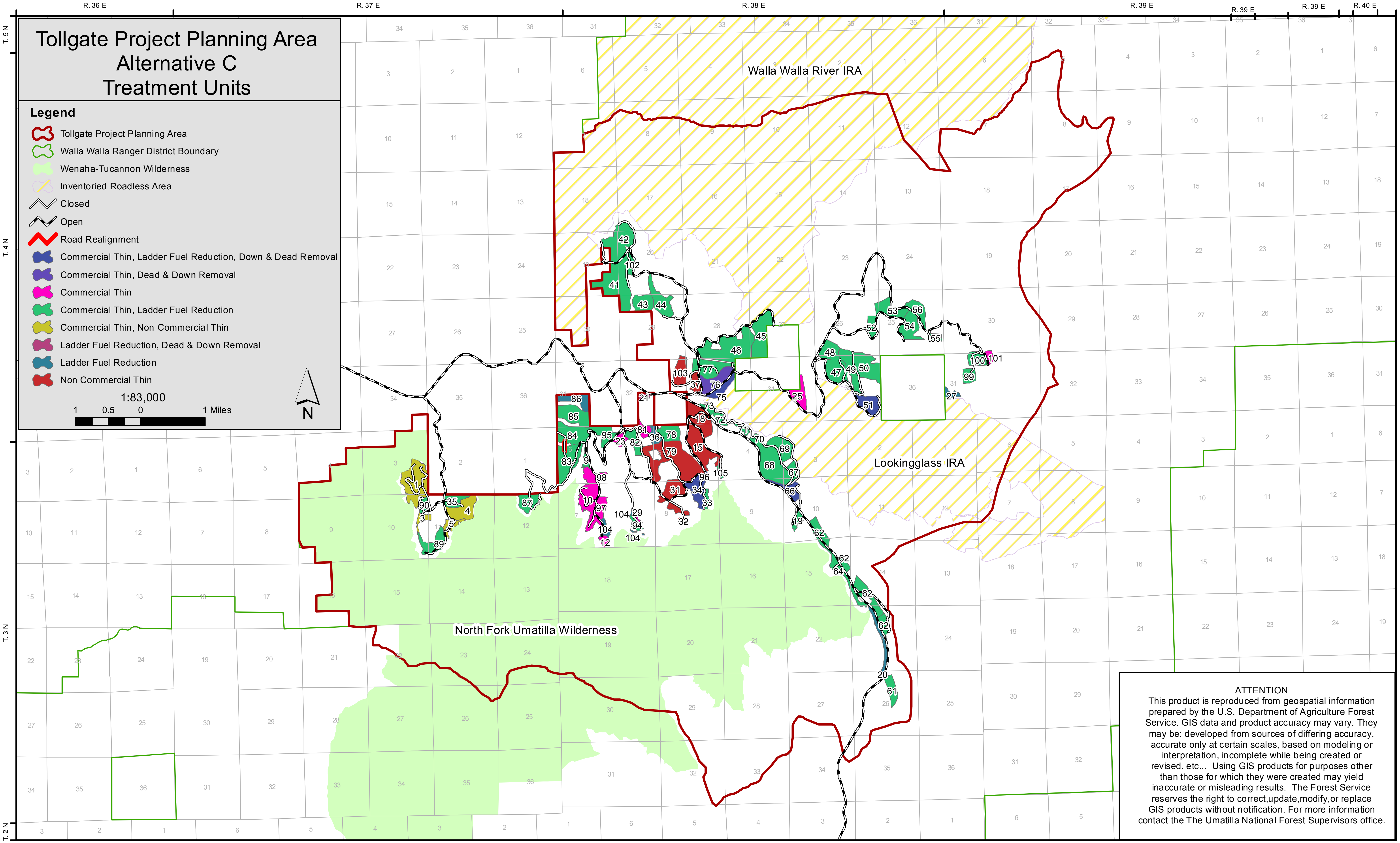
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# APPENDIX B

## PLANNED ACTIVITIES BY UNIT AND ALTERNATIVE

# APPENDIX B

**Table B1: Planning Unit Treatments for Alternative B**

| Unit # | Alt. B Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 1 | 134 | CT, NCT | Tractor | none |
| 3 | 17 | CT, NCT | Tractor | none |
| 4 | 72 | CT, NCT | Tractor | none |
| 5 | 22 | CT, NCT | Tractor | none |
| 9 | 17 | CT, LFR | Tractor | none |
| 10 | 148 | CT | Tractor | none |
| 12 | 17 | CT | Tractor | None |
| 15 | 109 | NCT | n/a | Mechanical |
| 18 | 86 | NCT | n/a | Mechanical |
| 19 | 17 | CT, LFR | Forwarder | Hand Piling/ Burn |
| 20 | 41 | LFR | n/a | Hand Piling/ Burn |
| 21 | 13 | LFR, DDR | n/a | Hand Piling/ Burn |
| 23 | 20 | CT | Tractor | none |
| 25 | 48 | CT | Forwarder | Mechanical |
| 26 | 104 | LFR | n/a | Hand Piling/ Burn |
| 27 | 14 | LFR | n/a | Hand Piling/ Burn |
| 29 | 5 | CT | Tractor | none |
| 31 | 78 | NCT | n/a | Mechanical |
| 32 | 11 | NCT | n/a | Mechanical |
| 33 | 27 | CT, LFR | Tractor | Hand Piling/Burn |
| 34 | 59 | CT, LFR, DDR | Forwarder | Mechanical |
| 35 | 38 | CT, LFR | Tractor | none |
| 36 | 23 | LFR | n/a | Mechanical |
| 37 | 29 | NCT | n/a | Hand Piling/Burn |
| 38 | 87 | CT, LFR | Tractor | none |
| 41 | 172 | CT, LFR | Tractor | none |
| 42 | 122 | CT, LFR | Tractor | none |
| 43 | 49 | CT, LFR | Tractor | none |
| 44 | 69 | CT, LFR | Tractor | none |

| Unit # | Alt. B Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 45 | 105 | CT, LFR | Tractor | none |
| 46 | 177 | CT, LFR | Tractor | none |
| 47 | 70 | CT, LFR | Tractor | none |
| 48 | 50 | CT, LFR | Forwarder | Mechanical |
| 49 | 62 | CT, LFR | Tractor | none |
| 50 | 89 | CT, LFR | Tractor | none |
| 51 | 54 | CT, LFR, DDR | Tractor | none |
| 52 | 29 | CT, LFR | Tractor | none |
| 53 | 60 | CT, LFR | Tractor | none |
| 54 | 66 | CT, LFR | Tractor | none |
| 55 | 13 | CT, LFR | Tractor | none |
| 56 | 41 | CT, LFR | Tractor | none |
| 61 | 36 | CT, LFR | Tractor | none |
| 62 | 132 | CT, LFR | Forwarder | Mechanical |
| 64 | 64 | CT, LFR | Forwarder | Mechanical |
| 66 | 40 | CT, LFR, DDR | Forwarder | Hand Piling/ Burn |
| 67 | 26 | CT, LFR | Tractor | none |
| 68 | 148 | CT, LFR | Tractor | none |
| 69 | 63 | CT, LFR | Tractor | none |
| 70 | 11 | CT, LFR | Tractor | none |
| 71 | 15 | CT, LFR | Tractor | none |
| 72 | 18 | CT, LFR | Tractor | none |
| 73 | 15 | CT, LFR | Tractor | none |
| 75 | 52 | CT, LFR, DDR | Forwarder | Mechanical |
| 76 | 70 | CT, LFR, DDR | Tractor | none |
| 77 | 77 | CT, LFR | Tractor | none |
| 78 | 50 | CT, LFR | Tractor | none |
| 79 | 206 | NCT | n/a | Mechanical |
| 81 | 22 | CT | Tractor | none |
| 82 | 38 | CT, LFR | Tractor | none |
| 83 | 102 | CT, LFR | Forwarder | Mechanical |
| 84 | 85 | CT, LFR | Forwarder | Mechanical |
| 85 | 78 | CT, LFR | Forwarder | Mechanical |

| Unit # | Alt. B Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 86 | 47 | LFR | n/a | Hand Piling/Burn |
| 87 | 47 | CT, LFR | Tractor | none |
| 89 | 57 | CT, LFR | Tractor | none |
| 90 | 21 | CT, LFR | Tractor | none |
| 94 | 17 | CT, LFR | Tractor | none |
| 95 | 47 | CT, LFR | Forwarder | Mechanical |
| 96 | 13 | CT, LFR, DDR | Forwarder | Mechanical |
| 97 | 32 | CT | Tractor | none |
| 98 | 12 | CT | Tractor | none |
| 99 | 27 | CT, LFR | Tractor | none |
| 100 | 37 | CT, LFR | Tractor | none |
| 101 | 14 | CT | Tractor | none |
| 102 | 19 | CT, LFR | Tractor | none |
| 103 | 49 | NCT | n/a | Hand Piling/Burn |
| 104 | 75 | LFR | n/a | Hand Piling/Burn |
| 105 | 7 | CT, LFR | Tractor | none |
| **Totals** | **4333** | | | |

## Table B2: Planning Unit Treatments for Alternative C

| Unit # | Alt. C Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 1 | 134 | CT, NCT | Tractor | none |
| 3 | 17 | CT, NCT | Tractor | none |
| 4 | 72 | CT, NCT | Tractor | none |
| 5 | 22 | CT, NCT | Tractor | none |
| 9 | 16 | CT, LFR | Tractor | none |
| 10 | 127 | CT | Tractor | none |
| 12 | 14 | CT | Tractor | None |
| 15 | 109 | NCT | n/a | Mechanical |

| Unit # | Alt. C Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 18 | 86 | NCT | n/a | Mechanical |
| 19 | 17 | CT, LFR | Forwarder | Hand Piling/ Burn |
| 20 | 1 | LFR | n/a | Hand Piling/ Burn |
| 21 | 13 | LFR, DDR | n/a | Hand Piling/ Burn |
| 23 | 20 | CT | Tractor | none |
| 25 | 48 | CT | Forwarder | Mechanical |
| 26 | 0 | LFR | n/a | Hand Piling/ Burn |
| 27 | 14 | LFR | n/a | Hand Piling/ Burn |
| 29 | 5 | CT | Tractor | none |
| 31 | 77 | NCT | n/a | Mechanical |
| 32 | 12 | NCT | n/a | Mechanical |
| 33 | 12 | CT, LFR | Tractor | Hand Piling/Burn |
| 34 | 59 | CT, LFR, DDR | Forwarder | Mechanical |
| 35 | 38 | CT, LFR | Tractor | none |
| 36 | 23 | LFR | n/a | Mechanical |
| 37 | 29 | NCT | n/a | Hand Piling/Burn |
| 38 | 0 | CT, LFR | Tractor | none |
| 41 | 172 | CT, LFR | Tractor | none |
| 42 | 121 | CT, LFR | Tractor | none |
| 43 | 49 | CT, LFR | Tractor | none |
| 44 | 69 | CT, LFR | Tractor | none |
| 45 | 104 | CT, LFR | Tractor | none |
| 46 | 177 | CT, LFR | Tractor | none |
| 47 | 70 | CT, LFR | Tractor | none |
| 48 | 50 | CT, LFR | Forwarder | Mechanical |
| 49 | 62 | CT, LFR | Tractor | none |
| 50 | 89 | CT, LFR | Tractor | none |
| 51 | 54 | CT, LFR, DDR | Tractor | none |
| 52 | 29 | CT, LFR | Tractor | none |
| 53 | 60 | CT, LFR | Tractor | none |
| 54 | 66 | CT, LFR | Tractor | none |
| 55 | 13 | CT, LFR | Tractor | none |
| 56 | 41 | CT, LFR | Tractor | none |

| Unit # | Alt. C Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 61 | 36 | CT, LFR | Tractor | none |
| 62 | 132 | CT, LFR | Forwarder | Mechanical |
| 64 | 61 | CT, LFR | Forwarder | Mechanical |
| 66 | 0 | CT, LFR, DDR | Forwarder | Hand Piling/ Burn |
| 67 | 26 | CT, LFR | Tractor | none |
| 68 | 148 | CT, LFR | Tractor | none |
| 69 | 60 | CT, LFR | Tractor | none |
| 70 | 7 | CT, LFR | Tractor | none |
| 71 | 15 | CT, LFR | Tractor | none |
| 72 | 18 | CT, LFR | Tractor | none |
| 73 | 15 | CT, LFR | Tractor | none |
| 75 | 38 | CT, LFR, DDR | Forwarder | Mechanical |
| 76 | 70 | CT, LFR, DDR | Tractor | none |
| 77 | 77 | CT, LFR | Tractor | none |
| 78 | 50 | CT, LFR | Tractor | none |
| 79 | 206 | NCT | n/a | Mechanical |
| 81 | 22 | CT | Tractor | none |
| 82 | 38 | CT, LFR | Tractor | none |
| 83 | 102 | CT, LFR | Forwarder | Mechanical |
| 84 | 85 | CT, LFR | Forwarder | Mechanical |
| 85 | 78 | CT, LFR | Forwarder | Mechanical |
| 86 | 47 | LFR | n/a | Hand Piling/Burn |
| 87 | 47 | CT, LFR | Tractor | none |
| 89 | 56 | CT, LFR | Tractor | none |
| 90 | 21 | CT, LFR | Tractor | none |
| 94 | 15 | CT, LFR | Tractor | none |
| 95 | 47 | CT, LFR | Forwarder | Mechanical |
| 96 | 10 | CT, LFR, DDR | Forwarder | Mechanical |
| 97 | 32 | CT | Tractor | none |
| 98 | 12 | CT | Tractor | none |
| 99 | 27 | CT, LFR | Tractor | none |
| 100 | 37 | CT, LFR | Tractor | none |
| 101 | 14 | CT | Tractor | none |

| Unit # | Alt. C Acres | Silvicultural Prescription | Harvest Method | Fuel Treatment |
|---|---|---|---|---|
| 102 | 19 | CT, LFR | Tractor | none |
| 103 | 49 | NCT | n/a | Hand Piling/Burn |
| 104 | 19 | LFR | n/a | Hand Piling/Burn |
| 105 | 7 | CT, LFR | Tractor | none |
| **Totals** | **3934** | | | |

# APPENDIX C

## ROADS

# Appendix C

**Table C-1 - Roads used in Alternative B and C**

| Road Number | Length - Miles | Access and Travel Management Category |
|---|---|---|
| 6400 | 6.04 | Seasonal |
| 3700050 | 0.10 | Seasonal |
| 3700051 | 0.19 | Seasonal |
| 3719 | 4.68 | Seasonal |
| 3725 | 0.69 | Seasonal |
| 6401 | 3.14 | Seasonal |
| 3700070 | 0.10 | Seasonal |
| 3715030 | 0.54 | Open |
| 3718 | 3.15 | Seasonal |
| 3718150 | 0.20 | Seasonal |
| 3719025 | 0.11 | Seasonal |
| 3719080 | 0.85 | Seasonal |
| 6400030 | 1.59 | Seasonal |
| 6400100 | 2.07 | Seasonal |
| 6401000 | 1.54 | Seasonal |
| 6401020 | 2.04 | Seasonal |
| 6406 | 2.95 | Seasonal |
| 6406050 | 0.05 | Seasonal |
| 3700040 | 0.76 | Closed |
| 3700040 | 2.21 | Closed |
| 3700041 | 1.05 | Closed |
| 3700060 | 0.43 | Closed |
| 3715020 | 0.33 | Closed |
| 3715034 | 1.30 | Closed |
| 3715035 | 0.41 | Closed |
| 3715036 | 0.27 | Closed |
| 3718150 | 2.46 | Closed |
| 3718155 | 0.70 | Closed |
| 3718200 | 0.59 | Closed |
| 3718300 | 0.21 | Closed |
| 3719020 | 0.46 | Closed |
| 3719025 | 0.79 | Closed |
| 3719030 | 0.91 | Closed |
| 3719050 | 0.44 | Closed |
| 3719060 | 1.06 | Closed |
| 3719070 | 0.64 | Closed |
| 3719083 | 0.31 | Closed |
| 3725020 | 0.08 | Closed |

| Road Number | Length - Miles | Access and Travel Management Category |
|---|---|---|
| 3725022 | 0.25 | Closed |
| 6400032 | 0.37 | Closed |
| 6400033 | 0.83 | Closed |
| 6400035 | 0.36 | Closed |
| 6401010 | 0.62 | Closed |
| 6401015 | 0.36 | Closed |
| 6401040 | 0.11 | Closed |
| 6401041 | 0.20 | Closed |
| 6401110 | 0.64 | Closed |
| 6401120 | 0.60 | Closed |
| 6401140 | 0.34 | Closed |
| 6406051 | 0.12 | Closed |
| 6406100 | 0.47 | Closed |
| 3715 | 3.06 | Closed |
| 6401900 | 0.52 | Seasonal |
| **Total** | **52** | |

# APPENDIX D

## SELECTED NATIONAL
## BEST MANAGEMENT PRACTICES

# Appendix D

## Selected National Best Management Practices (BMPs)

## for Tollgate Fuels Reduction Project

Specific resource protection measures and mitigation's listed below would be implemented in any action alternative. These resource protection measures and mitigation's are consistent with the Umatilla National Forest LRMP standards and guidelines. BMP's and resource protection measures are identified below. A general discussion of Best Management Practices (BMP's) and these specific BMPs are found in the document referenced below.

**National Best Management Practices for Water quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide FS-990a, April 2012**

**Plan-2. Project Planning and Analysis**

Objective: Use the project planning, environmental analysis, and decision making processes to incorporate water quality management BMPs into project design and implementation.

Practices: Include watershed specialists (hydrologist, soil scientist, geologist, and fish biologist) and other trained and qualified individuals on the interdisciplinary team for project planning, environmental analysis, and decision making to evaluate onsite watershed characteristics and the potential environmental consequences of the proposed activity(s).

- Determine potential or likely direct and indirect impacts to chemical, physical, and biological water quality, and watershed condition from the proposed activity.

    Develop site-specific BMP prescriptions, design criteria, and mitigation measures to achieve water quality management objectives. Consult local, regional, State, or other agency's required or recommended BMPs that are applicable to the activity.

- Document site-specific BMP prescriptions, design criteria, mitigation measures, and restoration, rehabilitation, and monitoring needs in the applicable National Environmental Policy Act (NEPA) documents, design plans, contracts, permits, authorizations, and operation and maintenance plans.

**Plan-3 Aquatic Management Zone Planning**

Objective: To maintain and improve or restore the condition of land around and adjacent to waterbodies in the context of the environment in which they are located, recognizing their unique values and importance to water quality while implementing land and resource management activities.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

- Design and implement project activities within the AMZ to:

    Avoid or minimize unacceptable impacts to riparian vegetation, groundwater recharge areas, steep slopes, highly erodible soils, or unstable areas.

**Road-4 Road Operations and Maintenance**

Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by controlling road use and operations and providing adequate and appropriate maintenance to minimize sediment production and other pollutants during the useful life of the road.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

*Operations*

- Designate season of use to avoid or restrict road use during periods when use would likely damage the roadway surface or road drainage features.
    - Upgrade drainage structures to avoid, to the extent practicable, or minimize direct discharges into nearby waterbodies.
- Ensure that drainage features are fully functional on completion of seasonal operations.
    - Shape road surfaces to drain as designed.
    - Construct or reconstruct drainage control structures as needed.
    - Ensure that ditches and culverts are clean and functioning.

*Maintenance Activities*

- Maintain the road surface drainage system to intercept, collect, and remove water from the road surface and surrounding slopes in a manner that reduces concentrated flow in ditches, culverts, and over fill slopes and road surfaces.
    - Clean ditches and catch basins only as needed to keep them functioning.
    - Do not undercut the toe of the cut slope when cleaning ditches or catch basins.
    - Use suitable measures to avoid, to the extent practicable, or minimize direct discharges from road drainage structures to nearby waterbodies.

- Ensure the necessary specifications concerning prehaul maintenance, maintenance during haul, and posthaul maintenance (putting the road back in storage) are in place when maintenance level 1 roads are opened for use on commercial resource management projects or other permitted activities.
    - Require the commercial operator or responsible party to leave roads in a satisfactory condition when project is completed.

**Road-5. Temporary Roads**

Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from the construction and use of temporary roads.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

- Use applicable practices of BMP Road-2 (Road Location and Design) to locate temporary roads.

**Road-2. Road Location and Design**

Objective: Locate and design roads to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

*Location*

- Locate roads to fit the terrain, follow natural contours, and limit the need for excavation.
- Locate roads as far from waterbodies as is practicable to achieve access objectives, with a minimum number of crossings and connections between the road and the waterbody.

**Road-7. Stream Crossings**

Manual or Handbook Reference: FSM 7722 and FSH 7709.56b

Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when constructing, reconstructing, or maintaining temporary and permanent waterbody crossings.

- Use crossing structures suitable for the site conditions and the RMOs.
- Culverts

  Align the culvert with the natural stream channel.

  Cover culvert with sufficient fill to avoid or minimize damage by traffic.

  Construct at or near natural elevation of the streambed to avoid or minimize potential flooding upstream of the crossing and erosion below the outlet

**Veg-1. Vegetation Management Planning**

Objectives: Use the applicable vegetation management planning processes to develop measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during mechanical vegetation treatment activities.

- Evaluate and field verify site conditions in the project area to design mechanical vegetation treatment prescriptions that avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.
  - Design mechanical vegetation treatment prescriptions to limit site disturbance, soil exposure, and displacement to acceptable levels as determined from the land management plan desired conditions, standards, and guidelines or other local direction or requirements.
  - Evaluate direct, indirect, and cumulative effects of vegetation alteration on streamflow regimes and consequent channel responses at suitable watershed scales.
  - Use local direction or requirements for slope, erosion potential, mass wasting potential, and other soil or site properties to determine areas suitable for ground-based, cable, and aerial yarding systems (see BMP Veg-4 [Ground-Based Skidding and Yarding Operations] and BMP Veg-5 [Cable and Aerial Yarding Operations]).
  - Consider site preparation and fuel treatment needs and options.

- o Use applicable practices of BMP Veg-8 (Mechanical Site Treatment) to determine areas suitable for mechanical treatments for site preparation, fuels treatment, habitat improvements, or other vegetation management purposes.

- Evaluate and field verify site conditions in the project area to design a transportation plan associated with the mechanical vegetation treatments to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.
  - o Use the logging system that best fits the topography, soil types, and season, while minimizing soil disturbance and road densities and that economically achieves silvicultural objectives.
  - o Evaluate the condition of system roads, including roads in storage, and unauthorized roads in the project area to determine their suitability for use in the project and any reconstruction or prehaul maintenance needs.
- Identify sources of rock for roadwork, riprapping, and borrow materials (see BMP Min-6 [Mineral Materials Resource Sites]).
- Identify water sources available for purchasers' use (see BMP Uses-3 [Administrative Water Developments]).
- Ensure the timber sale contract, stewardship contract, or other implementing document includes BMPs from the decision document to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.
  - o Use appropriate standard B and C provisions and regional or local provisions to address measures and responsibilities consistent with the BMPs in the decision document in the timber sale or stewardship contract.
  - o Delineate all protected or excluded areas, including AMZs and waterbodies, on the sale area map or project map.
  - o Delineate approved water locations, staging areas, and borrow areas on the sale area map or project map.
  - o Ensure that the final unit location, layout, acreage, and logging system or mechanical treatment and Knutson-Vandenberg Act plans are consistent with the decision document.

**Veg-2. Erosion Prevention and Control**

Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by implementing measures to control surface erosion, gully formation, mass slope failure, and resulting sediment movement before, during, and after mechanical vegetation treatments.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment

1. Develop erosion control and sediment plan that covers all disturbed areas including skid trails and roads, landings, cable corridors, temporary road fills, water source sites, borrow sites, or other areas disturbed during mechanical vegetation treatments.

- Refer to State or local forestry or silviculture BMP manuals, guidebooks, and trade publications for effective structural and nonstructural measures to:
  - o Apply soil protective cover on disturbed areas where natural revegetation is inadequate to prevent accelerated erosion before the next growing season.

- Maintain the natural drainage pattern of the area wherever practicable.
- Control, collect, detain, treat, and disperse stormwater runoff from disturbed areas.
- Divert surface runoff around bare areas with appropriate energy dissipation and sediment filters.
- Stabilize steep excavated slopes.

- Use suitable species and establishment techniques to cover or revegetate disturbed areas in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
- Use suitable measures in compliance with local direction to prevent and control invasive species.
- Install sediment and stormwater controls before initiating surface disturbing activities to the extent practicable.
- Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized.
  - Avoid ground equipment operations on unstable, wet, or easily compacted soils and on steep slopes unless operation can be conducted without causing excessive rutting, soil puddling, or runoff of sediments directly into waterbodies.
  - Evaluate site conditions frequently to assess changing conditions.
  - Adjust equipment operations as necessary to protect the site while maintaining efficient project operations.
- Install suitable stormwater and erosion control measures to stabilize disturbed areas and waterways on incomplete projects before seasonal shutdown of operations or when severe storm or cumulative precipitation events that could result in sediment mobilization to streams are expected.
- Routinely inspect disturbed areas to verify that erosion and stormwater controls are implemented and functioning as designed and are suitably maintained.
- Maintain erosion and stormwater controls as necessary to ensure proper and effective functioning.
  - Prepare for unexpected failures of erosion control measures.
- Implement mechanical treatments on the contour of sloping ground to avoid or minimize water concentration and subsequent accelerated erosion.

**Veg-3. Aquatic Management Zones**

Objectives: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when conducting mechanical vegetation treatment activities in the AMZ.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

- Clearly delineate AMZ locations and boundaries in the project area using suitable markings and structures.
  - Maintain or reestablish these boundaries as necessary during project implementation or operation.
  - Specify AMZ layout, maintenance, and operating requirements in contracts, design plans, and other necessary project documentation.

### Veg-4. Ground-Based Skidding and Yarding Operations

Objectives: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during ground-based skidding and yarding operations by minimizing site disturbance and controlling the introduction of sediment, nutrients, and chemical pollutants to waterbodies.

Practices: Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

- Use ground-based yarding systems only where physical site characteristics are suitable to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.
    - Use local direction or requirements for slope, erosion potential, mass wasting potential, and other soil or site properties to determine areas suitable for ground-based yarding systems.
- Use existing roads and skid trails networks to the extent practicable.
    - Create new roads and skid trails where re-use of existing ones would exacerbate soil, water quality, and riparian resource impacts.
- Design and locate skid trails and skidding operations to minimize soil disturbance to the extent practicable.
    - Designate skid trails to the extent practicable to limit site disturbance.
- Use suitable measures during felling and skidding operations to avoid or minimize disturbance to soils and waterbodies to the extent practicable.
    - Perform skidding or yarding operations when soil conditions are such that soil compaction, displacement, and erosion would be minimized.
    - Suspend skidding or yarding operations when soil moisture levels could result in unacceptable soil damage.
    - Directionally fell trees to facilitate efficient removal along predetermined yarding patterns with the least number of passes and least amount of disturbed area (e.g., felling-to-the-lead).
    - Directionally fell trees away from streambanks, shorelines, and other waterbody edges.
    - Remove logs from wet meadows or AMZs using suitable techniques to minimize equipment operations in the sensitive area and minimize dragging the logs on the ground.
    - Use low ground pressure equipment when practicable, particularly on equipment traveling over large portions of units with sensitive soils or site conditions.
- Use suitable measures to stabilize and restore skid trails after use.
    - Reshape the surface to promote dispersed drainage.
    - Install suitable drainage features.
    - Mitigate soil compaction to improve infiltration and revegetation conditions.
    - Apply soil protective cover on disturbed areas where natural revegetation is inadequate to prevent accelerated erosion before the next growing season.
    - Use suitable measures to promote rapid revegetation.
    - Use suitable measures in compliance with local direction to prevent and control invasive species.

# APPENDIX E

## SOILS

# Appendix E

Table E-1: Cumulative effects to Detrimental Soil Condition (DSC) by Alternative and recommendation of mitigation for DSC. Units with combined existing and proposed DSC that exceed forest S&Gs are in bold. Unit 3 is the only proposed unit currently exceeding forest S&Gs.

| | **Alt A** | **Alternative B Proposal Effects & Recommendations** | | | | | **Alternative C Proposal Effects & Recommendations** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit ID | Existing DSC (%) | Alt B (ac) | Total Detrimental (%) | Detrimental (ac) | Prescribed overlap of legacy & proposed DSC ac (%) | Skid trail overlap for DSC mitigation (ft) | Alt C (ac) | Total Detrimental (%) | Detrimental (ac) | Prescribed overlap of legacy & proposed DSC ac (%) | Skid trail overlap for DSC mitigation (ft) |
| **1** | 8% | 133.8 | **20%** | 26.8 | 20% | 11658 | 133.7 | **20%** | 26.7 | 20% | 11650 |
| **3** | 23% | 16.9 | **35%** | 5.9 | 70% | 5164 | 16.9 | **35%** | 5.9 | 70% | 5164 |
| 4 | 0% | 71.8 | 12% | 8.6 | 0% | 0 | 71.8 | 12% | 8.6 | 0% | 0 |
| 5 | 8% | 21.9 | 20% | 4.4 | 10% | 955 | 21.9 | **20%** | 4.4 | 10% | 955 |
| 9 | 0% | 17.4 | 18% | 3.1 | 0% | 0 | 16.0 | 18% | 2.9 | 0% | 0 |
| **10** | 6% | 147.7 | **21%** | 31.6 | 20% | 16501 | 126.7 | **22%** | 27.8 | 20% | 14665 |
| 12 | 0% | 16.8 | 18% | 3.0 | 0% | 0 | 13.7 | 19% | 2.6 | 0% | 0 |
| 15 | 0% | 109.2 | 0% | 0.0 | 0% | 0 | 109.2 | 0% | 0.0 | 0% | 0 |
| 18 | 4% | 85.5 | 4% | 3.4 | 0% | 0 | 85.5 | 4% | 3.4 | 0% | 0 |
| 19 | 0% | 17.4 | 12% | 2.0 | 0% | 0 | 17.4 | 12% | 2.0 | 0% | 0 |
| 20 | 0% | 41.0 | 0% | 0.0 | 0% | 0 | 41.0 | 0% | 0.0 | 0% | 0 |
| 21 | 0% | 13.4 | 0% | 0.0 | 0% | 0 | 13.4 | 0% | 0.0 | 0% | 0 |
| 23 | 0% | 20.3 | 17% | 3.4 | 0% | 0 | 20.3 | 17% | 3.4 | 0% | 0 |
| **25** | 12% | 47.9 | **20%** | 9.6 | 20% | 2815 | 47.9 | **20%** | 9.6 | 20% | 2815 |
| 26 | 0% | 103.7 | 0% | 0.0 | 0% | 0 | 0.0 | 0% | 0.0 | 0% | 0 |
| 27 | 0% | 13.9 | 0% | 0.0 | 0% | 0 | 13.9 | 0% | 0.0 | 0% | 0 |
| **29** | 0% | 5.2 | **31%** | 1.6 | 20% | 1182 | 5.2 | **31%** | 1.6 | 20% | 1182 |
| 31 | 5% | 78.5 | 5% | 3.9 | 0% | 0 | 77.2 | 5% | 3.9 | 0% | 0 |
| 32 | 0% | 11.5 | 0% | 0.0 | 0% | 0 | 11.5 | 0% | 0.0 | 0% | 0 |
| **33**[1] | 0% | 27.3 | 16% | 4.3 | 0% | 0 | 12.1 | **20%** | 2.5 | 10% | 892 |
| 34 | 0% | 59.1 | 9% | 5.5 | 0% | 0 | 59.1 | 9% | 5.5 | 0% | 0 |
| 35 | 0% | 38.4 | 17% | 6.6 | 0% | 0 | 38.4 | 17% | 6.6 | 0% | 0 |
| 36 | 8% | 23.3 | 8% | 1.9 | 0% | 0 | 23.3 | 8% | 1.9 | 0% | 0 |
| 37 | 0% | 28.7 | 0% | 0.0 | 0% | 0 | 28.7 | 0% | 0.0 | 0% | 0 |
| 38 | 0% | 87.1 | 14% | 12.5 | 0% | 0 | 0.0 | 0% | 0.0 | 0% | 0 |
| 41 | 0% | 171.7 | 14% | 24.6 | 0% | 0 | 171.7 | 14% | 24.6 | 0% | 0 |
| 42 | 0% | 121.7 | 15% | 18.6 | 0% | 0 | 120.8 | 15% | 18.5 | 0% | 0 |

[1] Unit 33 exceeds S&Gs only in Alternative C.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 0% | 49.0 | 16% | 7.9 | 0% | 0 | 49.0 | 16% | 7.9 | 0% | 0 |
| 44 | 0% | 68.9 | 16% | 11.3 | 0% | 0 | 68.9 | 16% | 11.3 | 0% | 0 |
| 45 | 0% | 104.1 | 16% | 16.5 | 0% | 0 | 104.1 | 16% | 16.5 | 0% | 0 |
| **46** | 5% | 176.9 | **20%** | 36.1 | 20% | 19766 | 176.9 | **20%** | 36.1 | 20% | 19766 |
| 47 | 2% | 70.1 | 17% | 11.8 | 0% | 0 | 70.1 | 17% | 11.8 | 0% | 0 |
| 48 | 0% | 50.2 | 10% | 5.0 | 0% | 0 | 50.2 | 10% | 5.0 | 0% | 0 |
| 49 | 0% | 61.8 | 15% | 9.4 | 0% | 0 | 61.8 | 15% | 9.4 | 0% | 0 |
| 50 | 0% | 88.8 | 15% | 13.7 | 0% | 0 | 88.8 | 15% | 13.7 | 0% | 0 |
| 51 | 0% | 53.6 | 16% | 8.4 | 0% | 0 | 53.6 | 16% | 8.4 | 0% | 0 |
| 52 | 3% | 29.4 | 18% | 5.4 | 0% | 0 | 29.4 | 18% | 5.4 | 0% | 0 |
| 53 | 0% | 59.5 | 15% | 9.1 | 0% | 0 | 59.5 | 15% | 9.1 | 0% | 0 |
| 54 | 0% | 66.4 | 15% | 10.0 | 0% | 0 | 66.4 | 15% | 10.0 | 0% | 0 |
| **55** | 0% | 13.3 | **20%** | 2.6 | 20% | 1881 | 13.3 | **20%** | 2.6 | 20% | 1881 |
| 56 | 2% | 40.8 | 19% | 7.7 | 0% | 0 | 40.8 | 19% | 7.7 | 0% | 0 |
| **61** | 5% | 35.8 | **20%** | 7.1 | 20% | 3847 | 35.8 | **20%** | 7.1 | 20% | 3847 |
| 62 | 0% | 132.0 | 9% | 11.9 | 0% | 0 | 132.0 | 9% | 11.9 | 0% | 0 |
| 64 | 5% | 63.9 | 17% | 11.0 | 0% | 0 | 61.0 | 18% | 10.7 | 0% | 0 |
| 66 | 5% | 39.6 | 16% | 6.4 | 0% | 0 | 39.6 | 16% | 6.4 | 0% | 0 |
| **67** | 5% | 25.8 | **25%** | 6.4 | 20% | 3699 | 25.8 | **25%** | 6.4 | 20% | 3699 |
| **68** | 5% | 147.7 | **21%** | 31.1 | 20% | 17225 | 147.7 | **21%** | 31.1 | 20% | 17225 |
| 69 | 0% | 63.1 | 17% | 10.6 | 0% | 0 | 60.1 | 17% | 10.2 | 0% | 0 |
| 70 | 8% | 10.7 | 29% | 3.1 | 30% | 2487 | 7.1 | **34%** | 2.4 | 30% | 2022 |
| 71 | 0% | 14.5 | 19% | 2.7 | 0% | 0 | 14.5 | 19% | 2.7 | 0% | 0 |
| 72 | 0% | 18.1 | 18% | 3.2 | 0% | 0 | 18.1 | 18% | 3.2 | 0% | 0 |
| **73** | 11% | 15.1 | **30%** | 4.5 | 30% | 3058 | 15.1 | **30%** | 4.5 | 30% | 3058 |
| 75 | 0% | 51.9 | 10% | 5.1 | 0% | 0 | 38.3 | 11% | 4.3 | 0% | 0 |
| **76** | 8% | 69.6 | **24%** | 16.9 | 20% | 8245 | 69.6 | **24%** | 16.9 | 20% | 8245 |
| 77 | 13% | 76.6 | 29% | 22.2 | 30% | 13281 | 76.6 | **29%** | 22.2 | 30% | 13281 |
| 78 | 0% | 50.0 | 16% | 8.0 | 0% | 0 | 50.0 | 16% | 8.0 | 0% | 0 |
| 79 | 0% | 206.1 | 0% | 0.0 | 0% | 0 | 206.1 | 0% | 0.0 | 0% | 0 |
| 81 | 0% | 22.1 | 17% | 3.7 | 0% | 0 | 22.1 | 17% | 3.7 | 0% | 0 |
| 82 | 0% | 37.7 | 15% | 5.5 | 0% | 0 | 37.7 | 15% | 5.5 | 0% | 0 |
| 83 | 0% | 102.1 | 9% | 9.1 | 0% | 0 | 102.1 | 9% | 9.1 | 0% | 0 |
| 84 | 3% | 84.9 | 13% | 10.6 | 0% | 0 | 84.9 | 13% | 10.6 | 0% | 0 |
| 85 | 0% | 78.1 | 9% | 6.7 | 0% | 0 | 78.1 | 9% | 6.7 | 0% | 0 |
| 86 | 0% | 46.7 | 0% | 0.0 | 0% | 0 | 46.7 | 0% | 0.0 | 0% | 0 |
| 87 | 0% | 46.6 | 16% | 7.6 | 0% | 0 | 46.6 | 16% | 7.6 | 0% | 0 |
| 89 | 0% | 57.0 | 16% | 8.8 | 0% | 0 | 55.7 | 16% | 8.7 | 0% | 0 |
| **90** | 5% | 21.3 | **22%** | 4.6 | 20% | 2585 | 21.3 | **22%** | 4.6 | 20% | 2585 |
| 94 | 0% | 16.9 | 18% | 3.0 | 0% | 0 | 14.4 | 19% | 2.7 | 0% | 0 |
| 95 | 0% | 47.1 | 10% | 4.8 | 0% | 0 | 47.1 | 10% | 4.8 | 0% | 0 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 96 | 0% | 12.6 | 14% | 1.8 | 0% | 0 | 9.4 | 17% | 1.6 | 0% | 0 |
| 97 | 0% | 32.2 | 18% | 5.9 | 0% | 0 | 32.2 | 18% | 5.9 | 0% | 0 |
| **98** | 0% | 12.0 | **20%** | 2.4 | 10% | 886 | 12.0 | **20%** | 2.4 | 10% | 886 |
| 99 | 0% | 26.6 | 16% | 4.2 | 0% | 0 | 26.6 | 16% | 4.2 | 0% | 0 |
| 100 | 0% | 37.3 | 15% | 5.5 | 0% | 0 | 37.3 | 15% | 5.5 | 0% | 0 |
| **101** | 2% | 13.5 | **21%** | 2.9 | 10% | 950 | 13.5 | **21%** | 2.9 | 10% | 950 |
| 102 | 0% | 19.4 | 17% | 3.3 | 0% | 0 | 19.4 | 17% | 3.3 | 0% | 0 |
| 103 | 6% | 48.9 | 6% | 2.9 | 0% | 0 | 48.9 | 6% | 2.9 | 0% | 0 |
| 104 | 5% | 75.1 | 5% | 3.8 | 0% | 0 | 18.4 | 5% | 0.9 | 0% | 0 |
| **105** | 0% | 7.0 | **26%** | 1.8 | 20% | 1332 | 7.0 | **26%** | 1.8 | 20% | 1332 |
| | | | | | Alt B Total | 117518 ft | | | | Alt C Total | 116102 ft |

# APPENDIX F

## CONSISTENCY WITH EASTSIDE SCREENS

# APPENDIX F

## *Tollgate Fuels Reduction Project*

## *Consistency with Eastside Screens*

## *Introduction and Analysis of Ranges of Variability*

This appendix presents a characterization of historical and existing vegetation conditions for a large landscape called the Tollgate Fuels Reduction Project Planning Area ("planning area"). Four indicators were used for the upland-forest characterization: potential vegetation, species composition, forest structure, and tree density.

The vegetation information summarized in this appendix was developed using the Most Similar Neighbor (MSN) imputation process (Crookston et al. 2002, Moeur and Stage 1995). The MSN algorithm uses canonical correlation analysis to derive a similarity function, and then chooses the most similar stand as a proxy from the global set of stands by comparing detailed design attributes (local variables) and lower-resolution indicator attributes (global variables). The most similar stand is selected by using the similarity function to maintain multivariate relationships between the global variables and the local variables.

The planning area contains approximately 46,460 acres of National Forest System lands and includes portions of the upper Umatilla, upper Walla Walla, and Lookingglass creek watersheds. This Appendix Considers all 46,460 acres located in the planning area; acreages are rounded to nearest 10 acres.

## *Potential Vegetation*

In the Tollgate planning area, 39 potential vegetation types (PVTs) were identified (Table F1). Twenty-five of the PVTs are forest types, comprising 81% of the analysis-area acreage, and the other 14 PVTs are nonforest types (19% of the planning area).

PVTs representing equivalent temperature and moisture environments have been aggregated into higher-level hierarchical units called plant association groups (PAG) and potential vegetation groups (PVG) (Powell et al. 2007). The 39 forest PVTs in the planning area were aggregated into 8 PAGs and 4 PVGs (Table F1) by using the information from Powell et al. (2007).

The upland forest PVGs are dry forest (3% of total acreage), moist forest (77%), and cold forest (<1%). This appendix uses upland forest PVGs when reporting vegetation conditions for the planning area. Table F2 presents certain biophysical characteristics of the forest PVGs.

When performing analysis of vegetation Historic Ranges of Variability (HRVs), existing vegetation was stratified into PVGs (Martin 2010). Since the cold upland forest PVG included less than 1,000 acres within the Tollgate planning area, it was largely ignored during HRV analysis because a full complement of cover types, structural stages, or tree density classes would not be expected for such a small amount of acreage (Martin 2010 and Powell 2010b).

## *Table F1 – Potential vegetation types (PVT) of the Tollgate planning area*

| PVG | PVT and PAG | PVT Acronym | Acres | Percent of Total | Percent of Forest |
|---|---|---|---|---|---|
| **Dry Upland Forest** (1,574 acres; 3%) | grand fir/elk sedge | ABGR/CAGE2 | 675 | 1 | 2 |
| | grand fir/birchleaf spiraea | ABGR/SPBE2 | 900 | 2 | 2 |
| | **Warm dry upland forestland PAG** | | 1574 | 3 | 4 |
| **Moist Upland Forest** (35,715 acres; 77%) | grand fir/queencup beadlily | ABGR/CLUN2 | 7309 | 16 | 19 |
| | grand fir/twinflower | ABGR/LIBO3 | 1247 | 3 | 3 |
| | grand fir/big huckleberry | ABGR/VAME | 4561 | 10 | 12 |
| | subalpine fir/queencup beadlily | ABLA/CLUN2 | 6620 | 14 | 18 |
| | subalpine fir/twinflower | ABLA/LIBO3 | 289 | 1 | 1 |
| | subalpine fir/false bugbane | ABLA/TRCA | 1095 | 2 | 3 |
| | subalpine fir/big huckleberry | ABLA/VAME | 2916 | 6 | 8 |
| | lodgepole pine(grand fir)/twinflower | PICO(ABGR)/LIBO3* | 433 | 1 | 1 |
| | lodgepole pine(grand fir)/big huckleberry/twinflower | PICO(ABGR)/VAME-LIBO3* | 409 | 1 | 1 |
| | lodgepole pine(subalpine fir)/big huckleberry | PICO(ABLA)/VAME* | < 1 | < 1 | < 1 |
| | **Cool moist upland forestland PAG** | | 24882 | 54 | 66 |
| | grand fir/swordfern-ginger | ABGR/POMU-ASCA2 | 73 | < 1 | < 1 |
| | grand fir/false bugbane | ABGR/TRCA | 34 | < 1 | < 1 |
| | **Cool very moist upland forestland PAG** | | 107 | < 1 | < 1 |
| | grand fir/Pacific yew/queencup beadlily | ABGR/TABR2/CLUN2 | 2385 | 5 | 6 |
| | grand fir/Pacific yew/twinflower | ABGR/TABR2/LIBO3 | 808 | 2 | 2 |
| | subalpine fir/claspleaf twistedstalk | ABLA/STAM2 | 9 | < 1 | < 1 |
| | **Cool wet upland forestland PAG** | | 3203 | 7 | 9 |
| | grand fir/Rocky Mountain maple-mallow ninebark | ABGR/ACGL-PHMA5 | 672 | 1 | 2 |
| | grand fir/Columbia brome | ABGR/BRVU | 88 | 0 | 0 |
| | Douglas-fir/Rocky Mountain maple-mallow ninebark | PSME/ACGL-PHMA5 | 1460 | 3 | 4 |
| | Douglas-fir/oceanspray | PSME/HODI | 2753 | 6 | 7 |
| | **Warm moist upland forestland PAG** | | 4973 | 11 | 13 |
| | grand fir/Rocky Mountain maple | ABGR/ACGL | 2551 | 5 | 7 |
| | **Warm very moist upland forestland PAG** | | 2551 | 5 | 7 |
| **Cold UF** (277 acres,1%) | subalpine fir/elk sedge | ABLA/CAGE2 | 51 | < 1 | < 1 |
| | subalpine fir/grouse huckleberry | ABLA/VASC | 213 | < 1 | < 1 |
| | subalpine fir/grouse huckleberry/Jacob's ladder | ABLA/VASC/POPU3 | 12 | < 1 | < 1 |
| | **Cold dry upland forestland PAG** | | 277 | < 1 | < 1 |
| **Nonforest** (8,892 acres; 19%) | bluebunch wheatgrass-Sandberg's bluegrass | AGSP-POSA12 | 3537 | 8 | |
| | bluebunch wheatgrass-Sandberg's bluegrass-onespike oatgrass | AGSP-POSA12-DAUN | 4 | 0 | |
| | alder snow slides | ALSI3 | 251 | 1 | |
| | mountain big sagebrush/elk sedge (montane) | ARTRV/CAGE2 | 59 | 0 | |

| | | | |
|---|---|---|---|
| mountain big sagebrush/Idaho fescue-bluebunch wheatgrass | ARTRV/FEID-AGSP | 262 | 1 |
| mountain big sagebrush-mountain snowberry/mountain brome | ARTRV-SYOR2/BRCA5 | 186 | 0 |
| tufted hairgrass | DECE | 41 | 0 |
| Idaho fescue-bluebunch wheatgrass | FEID-AGSP | 3280 | 7 |
| mallow ninebark-common snowberry | PHMA5-SYAL* | 306 | 1 |
| Kentucky bluegrass (dry meadow) | POPR | 29 | 0 |
| Sandberg's bluegrass-onespike oatgrass | POSA12-DAUN | 66 | 0 |
| western needlegrass | STOC* | 549 | 1 |
| mountain snowberry | SYOR2 | 17 | 0 |
| common cattail | TYLA | 5 | 0 |
| **Nonforest PVTs** | | **8892** | 19 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (NFS lands only). Powell et al. (2007) describes how PVTs were assigned to potential vegetation groups (PVG) and plant association groups (PAG). PVTs and PVGs are characterized generally in Powell (2000).

* These PVTs are plant community types or plant communities; all others are plant associations.

### *Table F2 – Biophysical characteristics for upland forest potential vegetation groups (PVG)*

| PVG | Area (acres) | Disturbances | Fire Regime | Patch Size (acres) |
|---|---|---|---|---|
| Dry Upland Forest | 1,574 | Fire<br>Insects<br>Harvest | Frequent Surface | 1-252 |
| Moist Upland Forest | 35,715 | Insects<br>Fire<br>Diseases | Infrequent Mixed | 1-583 |
| Cold Upland Forest | 277 | Wind<br>Insects<br>Fire | Replacement | 1-51 |

*Sources/Notes*: Area and patch size were derived from the Tollgate vegetation database (NFS lands only). Fire regime names correspond to Schmidt et al. (2002). Disturbances and fire regimes were supplied by the author and described in Appendix D and Agee (1996a, 2008).

### *Table F3 – Existing species composition (cover types) for the Tollgate planning area*

| Code | Cover Type Description | Acres | Pct. of Total | Pct. of Forested |
|---|---|---|---|---|
| **Non-forest** | Non-forest cover types (rocky, water, administrative sites, etc.) lacking extensive vegetation cover. | 301 | <1 | |
| **Herb-shrub** | Non-forest cover types dominated by herbaceous and shrub species | 8591 | 18 | |
| **Ponderosa pine** | Forest with ponderosa pine as the majority or plurality species | 2465 | 5 | 7 |
| **Douglas-fir** | Forest with Douglas-fir as the majority or plurality species | 9885 | 21 | 26 |
| **Western larch** | Forest with western larch as the majority or plurality species | 1045 | 2 | 3 |
| **Lodgepole pine** | Forest with lodgepole pine as the majority or plurality species | 3269 | 7 | 9 |
| **Broadleaved species** | Forest with various broadleaved trees as the majority or plurality | 578 | 1 | 2 |

| | | | | |
|---|---|---|---|---|
| | species | | | |
| **Grand fir** | Forest with grand fir as the majority or plurality species | 10416 | 22 | 28 |
| **Subalpine fir-Engelmann spruce** | Forest with subalpine fir and/or Engelmann spruce as the majority or plurality species | 9907 | 21 | 26 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (NFS lands only). The subalpine fir-Engelmann spruce cover type contains either a majority or plurality of either species, alone or in combination.

## Species Composition

Plant species occur in either pure or mixed communities called cover types. Tree species occurrence in the planning area was categorized by forest cover type, a classification of existing vegetation composition (Eyre 1980). Forest cover types reflect current tree species amounts in the Tollgate planning area.

Forest cover types are based on a predominance of tree stocking and are seldom pure – the grand fir type, for example, has a majority (50% or more) or plurality of grand fir trees but could also contain Douglas-fir and other tree species (Eyre 1980).

Table F3 summarizes existing species composition for the Tollgate planning area. It shows that the predominant forest cover type is grand fir (28% of the forest environment has grand fir as the majority or plurality tree species), followed by spruce-fir (26%) and Douglas-fir (26%), and lodgepole pine (9%).

About 19% of the Tollgate planning area supports non-forest vegetation (Table F1), much of which consists of dry meadows and bunchgrass communities dominated by Idaho fescue or bluebunch wheat-grass.

### HRV Analysis for Species Composition

An historical range of variability (HRV) analysis was used to evaluate species composition for the Tollgate planning area; HRV results are presented in Table F4. It summarizes the current amount of each forest cover type by potential vegetation group (PVG), as well as the estimated historical range.

An HRV analysis was completed for species composition of the forest vegetation Affected Environment. Because species composition varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. The cold upland forest PVG was not included because it has too few acres (277 acres) for a credible HRV analysis. Species composition HRV results are presented in Tables F4a, F4b, and F4c.

The information presented in Table F4a, F4b, and F4c suggests that dry forestland currently supports too much of the grand fir and Douglas-fir forest cover types, and too little of the ponderosa pine forest cover type. Moist forestland supports too much of the grand fir and spruce-fir forest cover types, and too little of the western larch, ponderosa pine, and lodgepole pine forest cover types.

***Table F4a – HRV analysis for species composition on the dry upland forest PVG***

| | Historical Range | | Current Amount | | |
|---|---|---|---|---|---|
| **Cover Type** | **Percent** | **Acres** | **Percent** | **Acres** | **HRV Interpretation** |
| Western juniper | 0-5 | 0-1786 | 0 | 0 | At low end of historical range |
| Ponderosa pine | 50-80 | 787-1259 | 51 | 800 | At low end historical range |
| Douglas-fir | 5-20 | 79-315 | 21 | 326 | Above historical range |

| | | | | | |
|---|---|---|---|---|---|
| Western larch | 1-10 | 16-157 | 0 | 0 | Below historical range |
| Broadleaved trees | 0-5 | 0-79 | 0 | 0 | At low end of historical range |
| Western white pine | 0-5 | 0-79 | 0 | 0 | At low end of historical range |
| Grand fir | 1-10 | 16-157 | 28 | 448 | Well above the historical range |

***Table F4b – HRV analysis for species composition on the moist upland forest PVG***

| | Historical Range | | Current Amount | | |
|---|---|---|---|---|---|
| **Cover Type** | **Percent** | **Acres** | **Percent** | **Acres** | **HRV Interpretation** |
| Ponderosa pine | 5-15 | 1786-5357 | 5 | 1665 | At low end of historical range |
| Douglas-fir | 15-30 | 5357-10715 | 27 | 9559 | Within the historical range |
| Western larch | 10-30 | 3572-10715 | 3 | 1045 | Well below the historical range |
| Broadleaved trees | 1-10 | 357-3572 | 2 | 578 | Within the historical range |
| Lodgepole pine | 25-45 | 8929-16072 | 9 | 3196 | Well below the historical range |
| Western white pine | 0-5 | 0-1786 | 0 | 0 | At low end of historical range |
| Grand fir | 15-30 | 5357-10715 | 28 | 9968 | Within historical range |
| Spruce-fir | 1-10 | 357-3572 | 27 | 9704 | Well above the historical range |

***Table F4c – HRV analysis for species composition on the cold upland forest PVG***

| | Historical Range | | Current Amount | | |
|---|---|---|---|---|---|
| **Cover Type** | **Percent** | **Acres** | **Percent** | **Acres** | **HRV Interpretation** |
| Ponderosa pine | 0-5 | 0-14 | 0 | 0 | This PVG contains too few acres (only 277) for an HRV analysis, which should not be completed for PVGs having less than 1,000 acres in a planning area. It is also not appropriate to add the cold PVG acreage to another PVG for analysis purposes because each PVG represents a unique biophysical environment. |
| Douglas-fir | 0-15 | 0-42 | 0 | 0 | |
| Western larch | 5-15 | 14-42 | 42 | 110 | |
| Broadleaved trees | 5-15 | 14-42 | 0 | 0 | |
| Lodgepole pine | 25-45 | 69-125 | 26 | 73 | |
| Grand fir | 5-15 | 14-42 | 0 | 0 | |
| Whitebark pine | 0-10 | 0-28 | 0 | 0 | |
| Spruce-fir | 15-35 | 42-97 | 73 | 204 | |

*Sources/Notes for tables F4a to AFc:* Current amounts are summarized from the Tollgate planning area vegetation database (NFS lands only). Historical ranges were adapted by Dave Powell from Morgan and Parsons (2001); they were based on multiple 1200-year simulations representing landscapes in a dynamic equilibrium with their disturbance regimes and summarized in Martin (2010) and Powell (2010b).

## Forest Structure

Oliver and Larson (1996) developed a forest structure classification system incorporating four structural stages. Oliver and Larson's (1996) system works well for conifer forests west of the Cascade Mountains, but it does not adequately characterize the diverse structural conditions of the interior Pacific Northwest. Therefore, the Oliver and Larson (1996) system was expanded to eight classes to include a wider spectrum of structural variation (O'Hara et al. 1996).

Table F5 uses a modified version of the 8-class system developed by O'Hara et al. (1996) to summarize the acreages and percentages of forest structural stages for the Tollgate planning area. It shows that the predominant forest structural stage is Old Forest Single Stratum (34% of the Affected Environment, OFSS), followed by Old Forest Multi Strata (31%, OFMS), Stand Initiation (21%, SI), Stem Exclusion (8%, SE), and Understory Reinitiation (6%, UR). OF structure classes, by definition, contain 10 or more live conifer trees per acre greater than or equal to 21” diameter at breast height (DBH).

### *Table F5 – Existing forest structural stages for the Tollgate planning area*

| Code | Forest Structural Stage Name | Acres | Percent of Total | Percent of Forested |
|---|---|---|---|---|
| **SI** | Stand Initiation | 2176 | 5 | 6 |
| **SE** | Stem Exclusion | 3184 | 7 | 8 |
| **UR** | Understory Reinitiation | 7746 | 17 | 21 |
| **OFMS** | Old Forest Multi Strata | 11600 | 25 | 31 |
| **OFSS** | Old Forest Single Stratum | 12859 | 28 | 34 |
| **NF** | Nonforest | 8892 | 19 | |

*Sources/Notes*: Summarized from the Tollgate vegetation database (NFS lands only). Forest structural stages are described in O’Hara et al. (1996).

## HRV Analysis for Forest Structure

An HRV analysis was completed for forest structural stages of the forest vegetation Affected Environment. Because forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (277 acres) for a credible HRV analysis. Forest structural stage HRV results are presented in Tables F6a, F6b, and F6c.

The information presented in Tables F6a, F6b, and F6c suggest that the SE and OFMS structural stages are outside of their historical ranges for the dry upland forest PVG, and that all structural stages are outside of respective historical ranges for the moist upland forest PVG.

The wildlife standard from the Eastside Screens (Forest Plan amendment #11; USDA Forest Service 1995) has two possible scenarios to follow as based on HRV results for late-old structural stages (LOS), with LOS defined as the old forest multi strata and old forest single stratum structural stages.

The wildlife standard directs that one of two scenarios is to be used:

1. Scenario A is to be used whenever either one of the LOS stages is below HRV. If both LOS stages occur within a single PVG and one is within or above HRV and one below, scenario A is to be used.
2. Scenario B is only to be used when both LOS stages for a particular PVG are within or above HRV.

For the dry and moist PVGs, results of the Eastside Screens wildlife standard are presented in the Screens Interpretation columns of tables F8a and F8b.

### *Table F6a – HRV analysis for forest structural stages on the dry upland forest PVG*

| | Historical Range | | Current Amount | | HRV | Screens |
|---|---|---|---|---|---|---|
| **Structural Stage** | **Percent** | **Acres** | **Percent** | **Acres** | **Interpretation** | **Interpretation** |
| Stand Initiation | 15-25 | 236-394 | 17 | 260 | Within HRV | |
| Stem Exclusion | 10-20 | 157-315 | <1 | 7 | Below HRV | |
| Understory Reinitiation | 5-10 | 79-157 | 9 | 141 | Within HRV | |
| Old Forest MS | 5-15 | 79-236 | 31 | 487 | Above HRV | **Scenario B** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Old Forest SS | 40-60 | 630-944 | 43 | 678 | Within HRV | |

### *Table F6b – HRV analysis for forest structural stages on the moist upland forest PVG*

| | Historical Range | | Current Amount | | HRV | Screens |
|---|---|---|---|---|---|---|
| **Structural Stage** | **Percent** | **Acres** | **Percent** | **Acres** | **Interpretation** | **Interpretation** |
| Stand Initiation | 20-30 | 7143-10715 | 5 | 1894 | Below HRV | |
| Stem Exclusion | 20-30 | 7143-10715 | 9 | 3177 | Below HRV | |
| Understory Reinitiation | 10-20 | 3572-7143 | 21 | 7477 | Above HRV | |
| Old Forest MS | 15-20 | 5357-7143 | 31 | 11095 | Above HRV | **Scenario B** |
| Old Forest SS | 10-20 | 3572-7143 | 34 | 12072 | Above HRV | |

### *Table F6c – HRV analysis for forest structural stages on the cold upland forest PVG*

| | Historical Range | | Current Amount | | HRV | Screens |
|---|---|---|---|---|---|---|
| **Structural Stage** | **Percent** | **Acres** | **Percent** | **Acres** | **Interpretation** | **Interpretation** |
| Stand Initiation | 20-45 | 55-125 | 8 | 22 | This PVG contains too few acres (only 277) for an HRV analysis, which should not be completed for PVGs having less than 1,000 acres in a planning area. It is also not appropriate to add the cold PVG acreage to another PVG for analysis purposes because each PVG represents a unique biophysical environment. | |
| Stem Exclusion | 10-30 | 28-83 | <1 | <1 | | |
| Understory Reinitiation | 10-25 | 28-69 | 46 | 128 | | |
| Old Forest MS | 10-25 | 28-69 | 6 | 18 | | |
| Old Forest SS | 5-20 | 14-55 | 39 | 109 | | |

*Sources/Notes for tables F8a to F8c:* Current amounts are summarized from the Tollgate vegetation database (NFS lands only).MS refers to multi strata and SS to single stratum. Upland forest potential vegetation groups (PVG) are described in Table F1 and Powell et al. (2007). Historical percentages (H%) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Martin (2010) and Powell (2010b). Forest structural stages are enumerated in Table F7. For the purposes of an HRV analysis, the bare ground structural stage is combined with the stand initiation stage.

## *Tree Density*

Suggested stocking guidelines (Cochran et al. 1994, Powell 1999) were used to analyze existing tree density levels for the Tollgate planning area. By using the stocking guidelines in conjunction with PVGs, it was possible to estimate how much forest acreage is currently overstocked (Table F12); the tree density analysis protocol is described in Powell (2009c).

Table 11 summarizes existing tree density classes for the forest vegetation Affected Environment. It shows that the predominant tree density class is High (76%), followed Moderate (15%) and then by Low (9%).

### *Table F7 – Existing tree density for the Tollgate planning area*

| Tree Density Category | Acres | Percent of Total | Percent of Forested |
|---|---|---|---|
| Low | 3356 | 7 | 9 |
| Moderate | 5548 | 12 | 15 |
| High | 28662 | 62 | 76 |

| | | |
|---|---|---|
| None (nonforest polygons) | 8798 | 19 |

*Sources/Notes*: Summarized from the Tollgate vegetation database (NFS lands only). Queries for assigning polygons to the tree density categories are provided in Powell (2009c).

## HRV Analysis for Tree Density

An HRV analysis was completed for tree density classes of the forest vegetation Affected Environment. Because tree density varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (277 acres) for a credible HRV analysis. Tree density HRV results are presented in Tables F8a, F8b, and F8c.

The information presented in Tables F8a, F8b, and F8c suggest that the dry upland forest PVG portion of the forest vegetation Affected Environment has too little of the Low density class and too much of the High density condition. For the Moist upland forest portion of the Affected Environment, all three density classes are outside their historical ranges of variability.

### *Table F8a – HRV analysis for tree density on the dry upland forest PVG*

| | Historical Range | | Current Amount | | |
|---|---|---|---|---|---|
| **Tree Density Class** | **Percent** | **Acres** | **Percent** | **Acres** | **HRV Interpretation** |
| Low (<45% CC) | 40-85 | 630-1338 | 5 | 83 | Well below historical range |
| Moderate (45-55%) | 15-30 | 236-472 | 30 | 466 | At upper end of historical range |
| High (>55% CC) | 5-15 | 79-236 | 65 | 1025 | Well above historical range |

### *Table F8b – HRV analysis for tree density on the moist upland forest PVG*

| | Historical Range | | Current Amount | | |
|---|---|---|---|---|---|
| **Tree Density Class** | **Percent** | **Acres** | **Percent** | **Acres** | **HRV Interpretation** |
| Low (<65% CC) | 20-40 | 7143-14286 | 9 | 3221 | Below historical range |
| Moderate (65-75%) | 25-60 | 8929-21429 | 14 | 5077 | Below historical range |
| High (>75% CC) | 15-30 | 5357-10715 | 77 | 27417 | Well above historical range |

### *Table F8c – HRV analysis for tree density on the cold upland forest PVG*

| | Historical Range | | Current Amount | | |
|---|---|---|---|---|---|
| **Tree Density Class** | **Percent** | **Acres** | **Percent** | **Acres** | **HRV Interpretation** |
| Low (<55% CC) | 15-30 | 40-80 | 19 | 52 | No interpretation because this PVG contains too few acres. |
| Moderate (55-65%) | 20-40 | 50-100 | 2 | 5 | |
| High (>65% CC) | 25-60 | 60-160 | 79 | 220 | |

*Sources/Notes for tables F13a to F13c:* Current amounts are derived from the Tollgate vegetation database (NFS lands only). Upland forest potential vegetation groups (PVG) are described in Table F1 and Powell et al. (2007). Historical ranges were taken from Schmitt and Powell (2008).

In March 1993, the Natural Resources Defense Council (NRDC) petitioned the U.S. Forest Service (Pacific Northwest Region) to halt all timber harvest activity in old growth forest occurring on national forest lands located east of the Cascade Mountain crest in Oregon and Washington (this geographical area is also known as the Eastside).

A month later in April 1993, a group of university and U.S. Forest Service research scientists released an "Eastside Forest Ecosystem Health Assessment" in draft form; this assessment is known as the "Everett Report" because it was directed by Dr. Richard Everett, a scientist located at the Wenatchee Forestry Sciences Laboratory (Everett et al. 1994).

In response to both the NRDC petition and the Everett report, the Pacific Northwest Region of the U.S. Forest Service issued interim direction in August 1993 requiring that timber sales prepared and offered by Eastside national forests be evaluated to determine their potential impact on riparian habitat, historical vegetation patterns, and wildlife fragmentation and connectivity.

This interim direction, known as the Eastside Screens, was used to amend Eastside forest plans when Regional Forester John Lowe signed a Decision Notice on May 20, 1994 to implement Regional Forester's Forest Plan Amendment #1 (USDA Forest Service 1994). Regional Forester's Forest Plan Amendment #1 is amendment #8 to the Umatilla National Forest Land and Resource Management Plan.

A slightly revised version of the Eastside Screens was issued as Regional Forester's Forest Plan Amendment #2 when Regional Forester John Lowe signed a Decision Notice on June 12, 1995 (USDA Forest Service 1995). Regional Forester's Forest Plan Amendment #2 is amendment #11 to the Umatilla National Forest Land and Resource Management Plan.

The Eastside Screens consist of six items: three general items (items 1 to 3), a riparian standard (item 4), an ecosystem standard (item 5), and a wildlife standard (item 6). This section describes how proposed silvicultural activities for the Tollgate Vegetation Management Project would comply with the Eastside Screens.

## *1. General Standards (items 1-3 in FP Amendment #11)*

Item 1 defines the scope of the Eastside Screens to be timber sales only.

**Finding:** The Proposed Action includes intermediate harvest silvicultural activities. In some portions of the planning area, these activities would be implemented using a commercial timber sale contract. Since item 1 defines the scope of the Eastside Screens to be timber sales only, and because a timber sale contract would be used to implement some of the silvicultural activities, this means that the Tollgate Vegetation Management Project must comply with the Eastside Screens.

Item 2 exempts personal-use firewood sales, post and pole sales, sales to protect health and safety, and sales within recreation special use areas from the amendment.

**Finding:** It is not anticipated that personal-use firewood sales, post and pole sales, sales to protect health and safety, or sales within recreation special use areas would be used to implement any of the thinning or regeneration cutting silvicultural activities, so item 2 does not apply to the Tollgate Vegetation Management Project.

Item 3 exempts five categories of timber sales from the ecosystem standard (but not from the riparian and wildlife standards):

- Precommercial thinning;
- Material sold as fiber;
- Dead material less than 7 inches in diameter, with incidental green volume;

- Salvage sales located outside mapped old growth, with incidental green volume; and
- Commercial thinning and understory removal sales located outside mapped old growth.

**Finding:** Both of the intermediate silvicultural activities (improvement cutting and low thinning) qualify for an exemption from the ecosystem standard because they are "commercial thinning and understory removal sales located outside mapped old growth" (the fifth category of timber sales included in item 3).

"Mapped old growth" is defined to include both of the Forest Plan allocations for old growth (C1 and C2) and as depicted on published maps distributed with the Forest Plan (USDA Forest Service 1990), as amended. This definition for mapped old growth follows written guidance and direction from the Pacific Northwest Region "Eastside Screens Oversight Team" (Lowe 1995).

However, direction from the Pacific Northwest Regional Office states that it is not mandatory to exempt "commercial thinning and understory removal sales" from the ecosystem standard and it further notes that in some circumstances, it may be advantageous to project viability to not exempt them (Lowe 1995).

The intermediate silvicultural activities described in the Proposed Action (improvement cutting, low thinning) are contained in the land base used for the historical range of variability (HRV) analysis for the Tollgate Vegetation Management Project, so there is no need to exempt them from the ecosystem standard, *and an exemption is not claimed*.

## *2. Riparian Standard (item 4 in Forest Plan Amendment #11)*

Item 4 of the Eastside Screens directs that timber sales (green and salvage) will not be planned or located in riparian areas.

Umatilla National Forest policy is that amendment #10 (USDA Forest Service and USDI Bureau of Land Management 1994) to the Land and Resource Management Plan will be applied in lieu of the riparian standard from the Eastside Screens.

Forest Plan amendment #10, commonly referred to as PACFISH, is interim direction designed to "arrest the degradation and begin the restoration of aquatic habitat and riparian areas on lands administered by the Forest Service and BLM; it applies to watersheds outside the range of the northern spotted owl that provide habitat for Pacific salmon, steelhead, and sea-run cutthroat trout." *This policy means that applying PACFISH also meets the Eastside Screens riparian standard.*

PACFISH uses a buffer concept to establish riparian habitat conservation areas (RHCA) along both sides of streams, rivers, lakes and other wetlands. RHCA widths extend from the edge of the active stream channel and they vary with stream class and whether a stream is fish bearing or not. RHCAs can be established using specified feet of slope distance (such as 300 feet on either side of perennial, fish-bearing streams) or in numbers of "site potential tree heights" (such as 2 site-potential tree heights for perennial, fish-bearing streams). The interim RHCA widths established by the PACFISH environmental assessment could be adjusted during watershed analysis or after site-specific analysis presenting a rationale for RHCA modifications.

Timber harvest activities are prohibited by the PACFISH amendment except in the following situations (see timber management standards, page C-9, in USDA Forest Service and USDI Bureau of Land Management 1994):

**1.** For catastrophic events such as fire, flooding, volcanic, wind or insect damage (when salvage harvest and fuelwood cutting is then allowed if compatible with riparian management objectives); and

**2.** When applying silvicultural practices to control stocking, reestablish and culture stands, and acquire desired vegetation characteristics in a manner that also meets riparian management objectives.

**Finding:** None of the proposed silvicultural activities will occur in any of the riparian habitat conservation areas established by PACFISH (FP amendment #10) not covered by exception authorities under item #2 above, and/or a Forest Plan amendment. The project will include a site specific Forest Plan amendment for the fuels treatments within RHCA of units 19, 38, 66, and 75 (unit 19 only, under Alternative C), described in Appendix B. The amendment will modify applicable PACFISH standards and guides regarding treatment within RHCAs. The amendment is site specific to the Tollgate Fuels Reduction project and will remain valid only during implementation of this project. The intention of the treatment is to control stocking by reducing stand density to within management zones recommended by Powell (1999, 2009c), and would result in desirable vegetation characteristics because post-treatment stands would be relatively resistant to passive or active crown fire, as described in the fire and fuels specialist report in the Tollgate Fuels Reduction project record. The desired vegetation characteristics would also meet riparian management objectives by reducing future wildfire intensity and severity (references), maintaining high levels of canopy cover and stream shade, and maintain moderate to high levels of woody structure to maintain hydrologic form and function (refer to the hydrology and fisheries reports in the Tollgate Fuels Reduction project record for a description of sufficient riparian canopy cover and woody debris/structure)

## *3. Ecosystem Standard (item 5 in Forest Plan Amendment #11)*

The ecosystem standard requires a landscape-level assessment of the historical range of variability (HRV) for structural stages, including a comparison of existing structural stage amounts with their historical ranges.

Item 5 (a) requires that the Forest Service “characterize the proposed timber sale and its associated watershed for patterns of stand structure by biophysical environment and compare to the Historic Range of Variability (HRV).”

Item 5 (c) requires that the Forest Service “characterize the difference in percent composition of structural stages between HRV and current conditions.”

**Finding:** Structural stages for the planning area were determined and then compared with their historical ranges (e.g., HRV) by biophysical environment. Results of the analysis results are included in Tables 10 and A6a, A6b, and A6c.

Item 5(b) requires that the Forest Service (1) “describe the dominant historical disturbance regime, i.e. the disturbance types and their magnitudes and frequencies. (2) Characterize the landscape pattern and abundance of structural stages maintained by the disturbance regime. Consider biophysical environmental setting across the landscape to make this determination. (3) Describe spatial pattern and distribution of structural stages under the HRV disturbance regime, and (4) Map the current pattern of structural stages and calculate their abundance by biophysical environmental setting” (USDA Forest Service 1995).

**Finding:** The analyses and map required by item 5(b) above are included within this analysis as follows:

- 5(b)(1): Table F2 and associated references
- 5(b)(2) and (3): Tables F6a-c and associated references
- 5(b)(4): Figure F6 below, Tables F6a-c and associated references

Item 5 (c) also requires that the Forest Service “identify structural conditions and biophysical environment combinations that are outside HRV conditions to determine potential treatment areas” (USDA Forest Service 1995).

**Finding:** Results from the structural stage HRV analysis were used when determining potential treatment areas for the Tollgate Vegetation Management Project. However, HRV analyses were also completed for species composition and tree density in addition to structural stages, so potential treatment areas may reflect HRV results for more than one of these indicators: species composition, structural stage, and tree density.

## *4. Wildlife Standard (item 6 in Forest Plan Amendment #11)*

Item 6 (a) states that the wildlife standard has two possible scenarios to follow as based on HRV results for late-old structural stages (LOS), and it defines LOS to be the “multi-stratum with large trees” and “single stratum with large trees” structural stages.

Item 6 (b) directs that:

**1.** Scenario A (item 6 d) is to be used whenever either one of the LOS stages is below HRV. If both LOS stages occur within a single biophysical environment and one is above HRV and one below, scenario A is to be used.

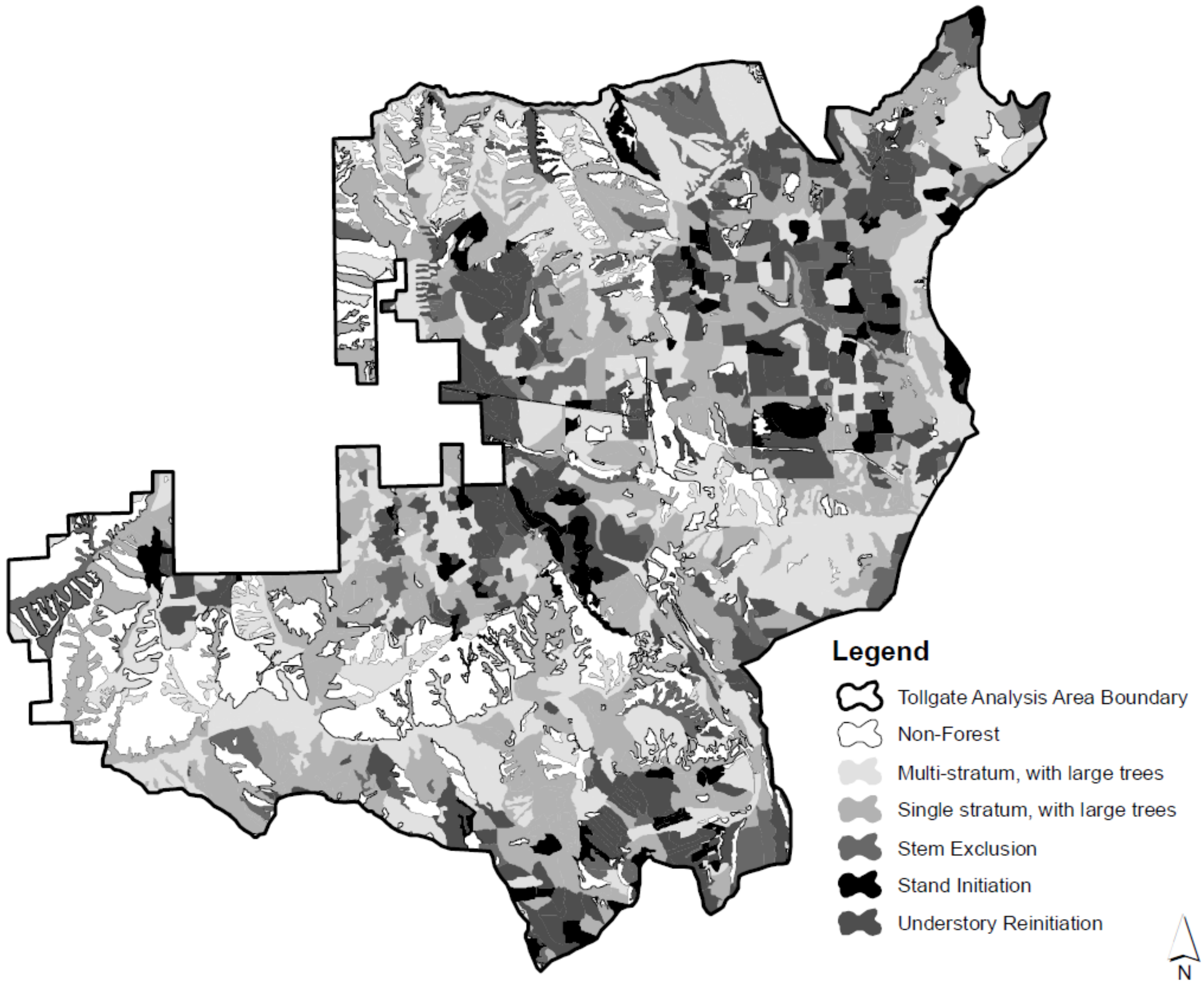
**2.** Scenario B (item 6 e) is to be used only when both LOS stages for a particular biophysical environment are within or above HRV.

**Finding:** Tables F6a-b in Appendix A show that both LOS stages are within or above HRV for both dry and the moist upland forest biophysical environments. According to item 6 (b) of the wildlife standard and the HRV results presented in Appendix Tables F6a-b, this means that **forest vegetation silvicultural activities for the Tollgate Vegetation Management Project must comply with Scenario B** for the Dry and Moist Upland Forest biophysical environments.

When performing analysis of vegetation Historic Ranges of Variability (HRVs), existing vegetation was stratified into PVGs (Martin 2010). Since the cold upland forest PVG included less than 1,000 acres within the Tollgate planning area, it was largely excluded during HRV analysis because a full complement of cover types, structural stages, or tree density classes would not be expected for such a small amount of acreage (Martin 2010 and Powell 2010b).

Item 6(e), which is scenario B of the wildlife standard, has the four requirements described below. Since the Dry and Moist Upland Forest biophysical environments must comply with Scenario B, all findings will be reported in the context of these biophysical environments.

1. Item 1 of scenario B establishes a priority for timber harvest activities, ranging from non-LOS stands (first priority) to smaller, isolated LOS stands (second priority) and finally to the interior of large LOS stands as a third priority (large LOS is defined as stands occupying 100 acres or more). Regeneration and group selection treatments are not allowed in the interior of large LOS stands (item 6(e)(1)(c)).




**5. Figure F1 – Map depicting the current pattern of structural stages for the entire Tollgate analysis area (app. 37,566 acres).** [1]

**Finding:** The underlying assumption of this item is that if timber sale activities were allowed to occur within LOS stands, they could cause significant reduction in LOS suitability, particularly if the silvicultural activities being applied involved regeneration cutting methods; however, all silvicultural activity proposed for LOS stands involves intermediate (non-regeneration) silvicultural activities that would maintain LOS characteristics after treatment. Since intermediate harvest is the only harvest activity proposed for LOS stands, regardless of which biophysical environment activities occur in or which of the wildlife screen scenarios they fall under, there is no regeneration cutting proposed (including group selection) for any portion of the LOS stands, including their interiors.

2. Item 2 of scenario B requires that connectivity be maintained between LOS stands and Forest Plan-designated old-growth areas, and that fragmentation of existing LOS stands be avoided by

[1] Structural stage names in the map legend correspond to the Eastside Screens names (see Table 9), and are synonymous with the old forest names or acronyms used for structural stages elsewhere in this report.

limiting silvicultural treatments to non-regeneration and single-tree selection prescriptions (this requirement is derived from item 6(d)(3) of scenario A).

**Finding:** Because only intermediate thinning treatments are included under Alternatives B and C (see Description of Alternatives section), connectivity would be maintained between LOS stands and Forest Plan-designated old-growth areas, and that fragmentation of existing LOS stands would be avoided by limiting silvicultural treatments to non-regeneration and single-tree selection prescriptions.

3. Item 3 of scenario B is a non-fragmentation standard that limits silvicultural treatments within the interior of large LOS stands to “non-fragmenting prescriptions such as thinning, single-tree selection (UEAM), salvage, understory removal, and other non-regeneration activities.” Group selection is allowed when openings mimic the natural forest pattern and do not exceed ½ acre in size.

   **Finding**: As described above for item 1, all silvicultural activity proposed for LOS stands involves improvement cutting, an intermediate silvicultural activity (and a “non-fragmenting prescription”) that would maintain LOS characteristics after treatment. Since improvement cutting is the only activity proposed for LOS stands, regardless of the biophysical environment in which it occurs or which of the wildlife screen scenarios under which it falls, there are no proposals to use group selection or other regeneration cutting methods for LOS stands.

4. Item 4 of scenario B requires that the snag, green-tree replacement, and down log standards from scenario A be followed (this is item 6(d)(4)(a) of scenario A), and that the goshawk standards from scenario A also be met (this is item 6(d)(4)(b) of scenario A), although item 4 does modify certain aspects of the post-fledging goshawk requirement from scenario A.

   **Finding:** The project’s design features and management requirements stipulate that snags and replacement tree numbers will meet or exceed Forest Plan standards. For specific details about the snags, replacement trees, and down logs items, see the wildlife specialist report. According to the wildlife specialist report, there are no known goshawk nests in the Tollgate planning area. If a nest is discovered during project preparation or implementation, most-suitable nesting habitat and post-fledging area standards from portion 6(d) of the Wildlife Standard would be applied at that time.

# APPENDIX G

## RESPONSES TO COMMENTS

# APPENDIX G

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# APPENDIX H

## POTENTIAL WILDERNESS INVENTORY

# APPENDIX H

## POTENTIAL WILDERNESS INVENTORY METHODOLOGY and RESULTS For Tollgate Fuels Reduction Project

**Index of Appendix H Maps**



**Background:**

This document describes the process and rationale used to inventory for and identify potential wilderness areas within the Tollgate Fuels Reduction project, Walla Walla Ranger District, Umatilla National Forest. The inventory is based on, and consistent with criteria found at Forest Service Handbook (FSH) 1909.12 Ch. 71.

Each step of the inventory process is visually documented as a map (see map discussion below).

These maps are displayed in this appendix.  The Forest Service used professional judgment and local knowledge regarding unique, site-specific conditions of each area being considered for placement in the inventory of potential wilderness areas.

Potential Wilderness Areas (PWA):  Areas of potential wilderness identified using inventory procedures found in Forest Service Handbook (FSH) 1909.12 Chapter 71 are called potential wilderness areas.  The inventory is conducted with the express purpose of identifying all lands that meet the criteria for being evaluated for wilderness suitability.

Potential wilderness areas are not a land designation decision, they do not imply or impart any particular level of management direction or protection, they are not an evaluation of potential wilderness (FSH 1909.12, Chapter 72), and lastly they are not preliminary administrative recommendations for wilderness designation (FSH 1909.12, Chapter 73).  The inventory of potential wilderness does not change the administrative boundary of any inventoried roadless areas (IRAs), any congressionally established wilderness, or any forest plan management areas.

Typically, PWAs substantially overlap and/or are contiguous with inventoried roadless areas. PWAs may also be contiguous with designated wilderness.  Some newly inventoried PWAs may be stand alone areas that were not identified as ‘roadless areas’ in Appendix C of the 1990 Umatilla Forest Plan and ‘inventoried roadless areas’ as identified in a set of maps in the 2001 Roadless Area Conservation Rule (RACR).  PWAs overlap inventoried roadless areas only where those acres of land are consistent with the inventory criteria (FSH 1909.12 Chapter 71) and may extend beyond IRA and wilderness boundaries consistent with inventory criteria.

The scope of this potential wilderness analysis inventory includes all acres contained within the Tollgate Fuels Reduction project boundary and lands outside the boundary sufficient to consider the potential wilderness area criteria found at FSH 1909.12 Chapter 71.1.   The portion of the Walla Walla River IRA that is located outside the project boundary was not considered because there would be no effects from the project in this area.

**Methodology:**
The inventory process was conducted through a sequence of GIS analyses and application of professional judgment.  The judgment applied was situational and instance by instance.  Each map (Appendix map H-1, H-2, H-3, H-4, and H-5) documents the outcome of the application of specific inventory criteria.  Inventory criteria were applied in a different order than appears in Chapter 71 but all criteria were considered and accounted for as described below under the Map H-1 – H-5 headings. Map H-6 is a summary map that depicts all five maps to aid the reader’s understanding of this inventory process.  Map H-0 is a roadless context map for the northern portion of the Umatilla National Forest.

Examples of typical situations that required applications of professional judgment included, but are not limited to:

1. placement of PWA boundaries along permanent natural or semi-permanent human-made features such as ridges, streams, topographic breaks, past harvest, or forest roads to facilitate easy on the ground identification.
2. whether to proceed through an isthmus (or pinch point) created between two roads or two harvest areas or place a PWA boundary across the isthmus;
3. whether to locate a PWA boundary around a peninsula or place the boundary through the peninsula.

Table H-1A is a summary of acres evaluated in the inventory process. Table H-1B was used to account for and display all polygons as described in Map H-4. Table H-1C is a summary of the areas that meet inventory criteria as potential wilderness areas. Table H-1D is a summary of all inventoried lands in the project area.

## Map by Map Description

**Table H-1A Potential Wilderness Area Inventory Summary**

| | Approximate Acres Tollgate Project Planning Area | Approximate Acres PWA Analysis Area |
|---|---|---|
| Map H-1; Total Acres Inventoried. Tollgate Project Planning area and PWA analysis area). | 46,464 | 52,284 |
| Map H-2; Acres Removed from inventory due to past harvest. | 14,878 | 16,894 |
| Map H-3; Acres removed from inventory due to activities related to roads | 10,364* | 11,690* |
| Map H-4; Resulting lands that remain after past harvest and activities related to roads are removed from inventory. (undeveloped lands) | 15,712** | 19,110** |
| Map H-5; Acres of Potential Wilderness Areas (PWAs) | **13,129**** | **15,403**** |
| Acres of undeveloped lands that did not meet PWA inventory criteria at FSH 1909.12 Chapter 71.1 (other undeveloped lands) | 2,584** | 3,709** |
| Lookingglass PWA (consists of the Lookingglass IRA and PWA contiguous to the IRA) | 3,660** | 5,917 ** |
| Walla Walla River PWA(consists of portions of the Walla Walla River IRA and PWA contiguous to the IRA) | 7,248** | 7,248** |
| PWA contiguous with North Fork Umatilla Wilderness | 1,151** | 1,151** |
| Isolated PWA (polygon 362) | 1,070** | 1,087** |
| Total PWA | **13,129**** | **15,403**** |

*Some of these acres may overlap with acres of past harvest.
** This number does not include polygons less than one acre in size.

The largest single PWA in this analysis is the Walla Walla River IRA/PWA at 7,248 acres followed by the Lookingglass PWA/IRA at 5,917 acres. There are numerous smaller PWAs contiguous with the North Fork Umatilla Wilderness totaling about 1,151 acres and one isolated PWA at 1,087 acres for a total of 15,403 acres of PWA within the PWA analysis area.

**Map H-0 (Context)**
Map H-0 is a roadless context map for the northern portion of the Umatilla National Forest.

**Map H-1 (Analysis Area)**
Map H-1 displays the Tollgate Fuels Reduction project planning area and PWA analysis area, forest roads, North Fork Umatilla Wilderness and Lookingglass and Walla Walla River inventoried roadless areas (IRAs). The project planning area for Tollgate Fuels Reduction is approximately 46,464 acres. A portion of the Lookingglass IRA is located outside the project planning area. The PWA analysis area extends beyond the project planning area to account for potential wilderness areas that are contingent with the whole of the Lookingglass IRA. The PWA analysis area is 52,284 acres.

**Map H-1A**
Map H-1A is an imagery photo representation of Map H-1.

**Map H-2 (Past Harvest)**
Map H-2 displays Tollgate Fuels Reduction project planning area and PWA analysis area, forest roads, past harvest, North Fork Umatilla Wilderness and Lookingglass Creek and Walla Walla Creek IRAs. The PWA analysis area was overlain with Walla Walla district's GIS harvest layer which displays locations of timber harvest over the past 50 years. Past timber harvest included clear-cuts to thinning units. The past timber harvest layer also includes lands where local knowledge and field visits were utilized to verify past timber harvest. Notes from field verification can be found in the Tollgate Fuels Reduction project record). In all cases, past timber harvest resulted in features such as stumps, skid trails etc. which are evident; therefore, all acres (approximately 16,894 acres) depicted on the map do not meet FSH 1909.12 Ch 71.11(9) inventory criteria and were removed from the inventory in Map H-3.

**Map H-3 (Roads)**
Map H-3 displays Tollgate Fuels Reduction project planning area and PWA analysis area, forest roads, acres with evidence of recognizable stumps, skid trails, uneven canopy closure, North Fork Umatilla Wilderness and Lookingglass Creek and Walla Walla Creek IRAs. The entire analysis area was overlain with Walla Walla district's GIS forest roads layer. Forest roads have associated permitted uses and maintenance. Road maintenance and many permitted uses have removed trees and created visible stumps in the corridor. These activities are expected to continue into the future.

During initial road construction trees were felled within a clearing limit to provide for safe and efficient construction and future operational safety of road users. Clearing distances away from the edge of a road varied by many factors including tree height, topographic slope, and other factors. Past clearing of trees along forest roads created stumps that are evident and recognizable.

Road maintenance occurs to varying degrees along each road according to an assigned maintenance level and available funding. Road maintenance includes the periodic clearing of brush and the falling of danger trees that present a hazard to forest visitors, employees, and contractors as defined by the Region 6 Danger Tree Policy (2008). The distance of the hazard removal away from a road varies by tree height, topographic slope, and other factors. Past removal of danger trees along forest roads created stumps that are evident and recognizable.

Harvest of trees for personal-use firewood is permitted within 300 feet of open forest roads consistent with project NEPA decisions and travel and access management plan decisions. Past firewood gathering along open forest roads created stumps that are evident and recognizable.

We recognize stumps are not present along every mile of forest road; for example roads adjacent to a meadow, talus, or a lake. The judgment we applied in setting a PWA boundary balanced inventory criteria regarding excluding past harvest and facilitating easy on-the-ground identification.

Based on local knowledge, and professional judgment regarding the evidence of recognizable stumps, skid trails, etc. which occur to varying degrees adjacent to forest roads (as described above) and to facilitate easy on-the-ground identification of a uniform, measurable boundary along a semi-permanent, human-made feature; the boundary was set as 300 feet each side of the forest road.
This boundary is fully consistent with and supported by the following inventory criteria.

- FSH 1909.12 at 71.1(3); potential wilderness areas do not contain forest roads therefore all acres that are a forest road will be removed from the inventory in Map H-4.
- FSH 1909.12 at 71.1(9); acres with evidence of past logging and roads will be removed from the inventory in Map H-4.
- FSH 1909.12, at 71; locate potential wilderness area boundaries at semi-permanent, human-made features to facilitate easy on-the-ground identification of a boundary.

Therefore, highlighted acres along forest roads (approximately 11,690 acres) in Map H-3 were removed from the inventory in Map H-4. Note some of the highlighted acres overlap with acres removed due to past harvest activities.

**Map H-4 ((Acres not containing Past Timber Harvest or Forest Roads)**
Map H-4 displays Tollgate Fuels Reduction project planning area and PWA analysis area, forest roads, acres that do not contain evidence of past harvest or forest roads (undeveloped lands) and Lookingglass Creek and Walla Walla Creek IRAs. Approximately 363 individual polygons of undeveloped lands were evaluated in the PWA analysis area. Two hundred thirty two (232) individual polygons less than 1 acre in size (totaling 39 acres) were eliminated from further study. The removal of these polygons resulted in 131 individual polygons, ranging in size from 1 acre to approximately 7,140 acres, covering approximately 19,110 acres.

Map H-4 displays the remaining 131 polygons of undeveloped lands, each with its own unique, numeric identifier. These polygons do not have substantially recognizable stumps, do not contain forest roads, and each polygon boundary is greater than or equal to 300 feet from a forest road.

**Map H-5 (Potential Wilderness Areas and Other Undeveloped Lands)**
Map H-5 displays the North Fork Umatilla Wilderness, Walla Walla River and Lookingglass IRAs, and Forest Service's completed inventory of PWAs within Tollgate Fuels Reduction

project planning area and PWA analysis area. Map H-5 also displays the remaining other undeveloped lands.

The acres of the Walla Walla River and Lookingglass IRAs and each of the other undeveloped polygons in Map H-4 were considered individually and compared to inventory criteria found at FSH 1909.12 at 71.1 (1, 2a, 2b, 2c). This process and the results are documented in Table H-1B below and displayed in Map H-5. Acres of any polygon need only meet one of the four found at FSH 1909.12 71.1 criteria 1, 2a, 2b, or 2c to be retained and displayed on Map H-5 as PWA.

Of the 131 polygons (19,110 acres) evaluated in the PWA analysis area, 93 polygons, totaling 3,709 acres (2,584 acres within the project planning area), are not contiguous with wilderness, primitive areas, Administration-endorsed wilderness, or potential wilderness in other Federal ownership due to the presence of forest roads and/or past timber harvest activity. Based on review of a site-specific orthophoto (project record) and local knowledge, each of these individual polygons is a part of a larger ecosystem and not a separate, self-contained ecosystem, such as found on an island surrounded by water. These polygons cannot be separately preserved due to physical terrain or a natural condition in part because of their small size and in part because they are each part of the larger, continuous ecosystem distributed throughout the project area. Based on the discussion above, local knowledge and professional judgment, none of these individual polygons met inventory criteria, and therefore were removed from the inventory. They will be evaluated as "other undeveloped lands" and discussed in Chapter 3 of the EIS.

One isolated polygon, #362 (1,087acres) meets PWA criteria 71.1 (2a). It is less than 5,000 acres but can be preserved due to physical and natural features. This polygon is retained in the inventory.

Approximately 2,317 acres are contiguous with either the North Fork Umatilla wilderness area or the Walla Walla River or Lookingglass IRAs. These polygon acres generally met criteria 71.1 (2c) however, some contiguous acres were removed from the inventory based on professional judgment when locating a boundary at a prominent natural or semi-permanent human-made feature to facilitate easy on-the-ground identification. The Forest Service interpreted '*prominent natural or semi-permanent human-made*' to include features such as, but not limited to, topographic breaks, streams, ridges, and the existing administrative boundaries of wilderness and/or inventoried roadless areas. These judgments are documented in Table H-1B and associated maps/documents in the Wilderness Potential portion of the Tollgate Fuels Reduction project file. The remaining contiguous acres are retained in the inventory. These areas are displayed in Map H-5 and in Table H-1C.

The Walla Walla River IRA (polygon # 363) and Lookingglass IRA (polygon # 364) were examined as independent units, separate from the polygons discussed above. The IRAs were examined with the same techniques as each of the other individual polygons.

All of the Walla Walla River IRA acres located within the Tollgate project planning area meet potential wilderness criteria. The entire Lookingglass IRA, both inside and outside the project area, meet potential wilderness criteria. Regardless of the outcome, this inventory does not change the administrative boundary for either IRA, which was established in the Roadless Area Conservation Rule (2001). Both IRAs/PWAs are displayed on map H-5.

**Map H-6 (Inventory Process Summary)**

Map H-6 is a summary map that displays all five maps described above.

**Maps H-7 and H-8**

Maps display interaction between Potential Wilderness and Alternatives B and C treatment units.

**Map H-9 and H-10**
Maps display interaction between Other Undeveloped Lands and Alternative B and C treatment units.

## Table H-1B: Tollgate Fuels Reduction Potential Wilderness Inventory

The following inventory for the Tollgate Fuels Reduction project planning area was created using the inventory criteria found in Forest Service Handbook (FSH) 1909.12 Chapter 71.1. Each polygon and IRA from Map H-4 (described above) were examined against the following criteria from FSH 1909.12 Chapter 71.1:

**(1)** Area is more than 5,000 acres in size

**(2)** Area contains less than 5,000 acres, but can meet one or more of the following criteria:

**2a.** Area can be preserved due to physical terrain and natural conditions.

**2b.** Areas are self-contained ecosystems, such as an island, that can be effectively managed as a separate unit of the National Wilderness Preservation System.

**2c.** Areas are contiguous to existing wilderness, primitive areas, Administration-endorsed wilderness, or potential wilderness in other Federal ownership, regardless of their size.

The Forest Service relied on local knowledge and judgment regarding unique, site specific conditions of each area being considered for placement on the inventory of potential wilderness. Delineation of areas for potential wilderness inventory; locate boundaries at prominent natural or semi-permanent human-made features to facilitate easy on-the-ground identification.

**Note:** In general, the scope of this potential wilderness inventory analysis was limited to acreage contained within the project planning area boundary. However, the Forest Service's inventory crossed the project planning area boundary to include all of the Lookingglass IRA and acres immediately adjacent to the east end of the Lookingglass IRA. Polygons were examined as an entire unit (both portions that occur inside and outside of planning area) against the potential wilderness area criteria.

Polygons less than 1 acre in size were dropped from the inventory. The inventory was conducted in January of 2012.

| Polygon ID | Acres | Meets one or more criteria | FSH1909.12 71.1(1) Is area greater than 5000 acres in size? | FSH1909.12 71.1(2a) Can be preserved due to terrain? | FSH1909.12 71.1(2b) Is it a self-contained ecosystem? | FSH1909.12 71.1(2c) Is area contiguous? |
|---|---|---|---|---|---|---|
| 1 | 3.91 | N | N | N | N | N |
| 4 | 16.80 | N | N | N | N | N |
| 8 | 89.32 | Y | N | N | N | Y |
| 9 | 21.86 | N | N | N | N | N |
| 12 | 1.32 | N | N | N | N | N |
| 13 | 7.71 | Y | N | N | N | Y |
| 14 | 21.71 | Y | N | Y | N | Y |
| 15 | 4.92 | N | N | N | N | N |
| 16 | 6.41 | N | N | N | N | N |
| 17 | 19.55 | N | N | N | N | N |

| Poly ID | Acres | Meets one or more criteria | FSH1909.12 71.1(1) Is area greater than 5000 acres in size? | FSH1909.12 71.1(2a) Can be preserved due to terrain? | FSH1909.12 71.1(2b) Is it a self-contained ecosystem? | FSH1909.12 71.1(2c) Is area contiguous? |
|---|---|---|---|---|---|---|
| 21 | 194.50 | Y | N | N | N | Y |
| 23 | 36.29 | Y | N | Y | N | Y |
| 42 | 7.16 | Y | N | Y | N | Y |
| 46 | 69.11 | Y | N | Y | N | Y |
| 49 | 56.12 | N | N | N | N | N |
| 50 | 12.00 | Y | N | Y | N | Y |
| 52 | 50.92 | Y | N | Y | N | Y |
| 54 | 11.01 | N | N | N | N | N |
| 56 | 6.31 | N | N | N | N | N |
| 57 | 8.92 | Y | N | N | N | Y |
| 60 | 7.02 | Y | N | Y | N | Y |
| 64 | 2.38 | N | N | N | N | N |
| 66 | 1.17 | N | N | N | N | N |
| 67 | 1.13 | N | N | N | N | N |
| 70 | 8.02 | Y | N | N | N | N |
| 71 | 4.07 | Y | N | Y | N | Y |
| 75 | 82.09 | Y | N | Y | N | Y |
| 78 | 6.19 | N | N | N | N | N |
| 80 | 1.20 | N | N | N | N | N |
| 83 | 2.06 | N | N | N | N | N |
| 84 | 132.07 | Y | N | N | N | Y |
| 86 | 4.10 | N | N | N | N | N |
| 89 | 21.31 | N | N | N | N | N |
| 92 | 15.37 | Y | N | Y | N | Y |
| 94 | 70.03 | Y | N | Y | N | Y |
| 97 | 14.25 | Y | N | Y | N | Y |
| 101 | 8.17 | N | N | N | N | N |
| 103 | 3.07 | Y | N | N | N | Y |
| 105 | 62.21 | Y | N | Y | N | Y |
| 110 | 40.86 | Y | N | Y | N | Y |
| 111 | 211.17 | Y | N | Y | N | Y |
| 117 | 3.63 | N | N | N | N | N |
| 119 | 11.62 | N | N | N | N | N |
| 122 | 12.06 | Y | N | Y | N | Y |
| 125 | 3.64 | N | N | N | N | N |
| 127 | 38.59 | Y | N | Y | N | Y |
| 128 | 3.57 | N | N | N | N | N |

| Poly ID | Acres | Meets one or more criteria | FSH1909.12 71.1(1) Is area greater than 5000 acres in size? | FSH1909.12 71.1(2a) Can be preserved due to terrain? | FSH1909.12 71.1(2b) Is it a self-contained ecosystem? | FSH1909.12 71.1(2c) Is area contiguous? |
|---|---|---|---|---|---|---|
| 129 | 1.87 | Y | N | Y | N | Y |
| 133 | 17.26 | N | N | N | N | N |
| 134 | 195.13 | N | N | N | N | N |
| 135 | 11.05 | N | N | N | N | N |
| 138 | 1.54 | N | N | N | N | N |
| 142 | 1.35 | N | N | N | N | N |
| 143 | 17.14 | Y | N | N | N | Y |
| 147 | 4.37 | N | N | N | N | N |
| 159 | 39.01 | N | N | N | N | N |
| 160 | 1.64 | N | N | N | N | N |
| 165 | 66.94 | N | N | N | N | N |
| 167 | 100.67 | N | N | N | N | N |
| 168 | 4.37 | N | N | N | N | N |
| 171 | 3.57 | N | N | N | N | N |
| 173 | 1.12 | N | N | N | N | N |
| 175 | 2.69 | N | N | N | N | N |
| 179 | 93.76 | N | N | N | N | N |
| 180 | 1.08 | N | N | N | N | N |
| 183 | 4.89 | N | N | N | N | N |
| 185 | 2.32 | N | N | N | N | N |
| 186 | 2.41 | Y | N | Y | N | Y |
| 187 | 11.43 | N | N | N | N | N |
| 191 | 1.46 | N | N | N | N | N |
| 193 | 4.81 | N | N | N | N | N |
| 198 | 1.76 | N | N | N | N | N |
| 199 | 2.14 | N | N | N | N | N |
| 208 | 11.17 | N | N | N | N | N |
| 209 | 24.03 | N | N | N | N | N |
| 212 | 12.31 | N | N | N | N | N |
| 213 | 10.22 | Y | N | Y | N | Y |
| 227 | 9.80 | N | N | N | N | N |
| 235 | 1.55 | N | N | N | N | N |
| 240 | 9.83 | N | N | N | N | N |
| 241 | 1.08 | N | N | N | N | N |
| 242 | 53.46 | N | N | N | N | N |
| 246 | 7.00 | N | N | N | N | N |
| 247 | 5.54 | N | N | N | N | N |
| 254 | 26.59 | Y | N | N | N | Y |

| Poly ID | Acres | Meets one or more criteria | FSH1909.12 71.1(1) Is area greater than 5000 acres in size? | FSH1909.12 71.1(2a) Can be preserved due to terrain? | FSH1909.12 71.1(2b) Is it a self-contained ecosystem? | FSH1909.12 71.1(2c) Is area contiguous? |
|---|---|---|---|---|---|---|
| 257 | 1.20 | N | N | N | N | N |
| 259 | 9.72 | N | N | N | N | N |
| 263 | 68.59 | Y | N | Y | N | Y |
| 266 | 6.41 | N | N | N | N | N |
| 269 | 135.94 | N | N | Y | N | N |
| 272 | 16.37 | N | N | N | N | N |
| 278 | 34.07 | N | N | N | N | N |
| 279 | 2.63 | N | N | N | N | N |
| 280 | 6.24 | N | N | N | N | N |
| 281 | 90.01 | N | N | N | N | N |
| 282 | 19.89 | N | N | N | N | N |
| 283 | 28.14 | N | N | N | N | N |
| 284 | 186.26 | N | N | N | N | N |
| 285 | 22.88 | N | N | N | N | N |
| 290 | 22.10 | N | N | Y | N | |
| 293 | 245.74 | N | N | N | N | N |
| 294 | 91.77 | N | N | N | N | N |
| 295 | 514.75 | N | N | N | N | N |
| 310 | 9.38 | N | N | N | N | N |
| 311 | 17.79 | N | N | N | N | N |
| 320 | 6.45 | N | N | N | N | N |
| 324 | 10.46 | N | N | N | N | N |
| 325 | 8.18 | N | N | N | N | N |
| 340 | 639.25 | Y | N | N | N | Y |
| 341 | 3.35 | N | N | N | N | N |
| 342 | 3.03 | N | N | N | N | N |
| 343 | 98.90 | Y | N | N | N | Y |
| 345 | 111.24 | Y | N | N | N | Y |
| 346 | 20.15 | N | N | N | N | N |
| 347 | 22.56 | N | N | N | N | N |
| 348 | 7.34 | N | N | N | N | N |
| 349 | 8.94 | N | N | N | N | N |
| 350 | 33.86 | N | N | N | N | N |
| 351 | 59.65 | Y | N | N | N | Y |
| 352 | 973.54 | N | N | N | N | N |
| 353 | 140.95 | N | N | N | N | N |
| 354 | 37.49 | N | N | N | N | N |
| 355 | 11.98 | N | N | N | N | N |

| Poly ID | Acres | Meets one or more criteria | FSH1909.12 71.1(1) Is area greater than 5000 acres in size? | FSH1909.12 71.1(2a) Can be preserved due to terrain? | FSH1909.12 71.1(2b) Is it a self-contained ecosystem? | FSH1909.12 71.1(2c) Is area contiguous? |
|---|---|---|---|---|---|---|
| 357 | 4.54 | N | N | N | N | N |
| 358 | 15.00 | N | N | N | N | N |
| 359 | 2.02 | N | N | N | N | N |
| 362 | 1086.64 | Y | N | Y | N | N |
| 363 | 7139.74 | Y | Y | Y | Y | Y |
| 364 | 4858.92 | Y | Y | Y | Y | |
| **Total Acres** | **19,110** | | | | | |

### Inventory Results

In summary the following areas meet inventory criteria as potential wilderness areas and are displayed in Map H-5.

**Table H-1C; Final Inventory of Potential Wilderness Areas for the Tollgate Fuels Reduction Project**

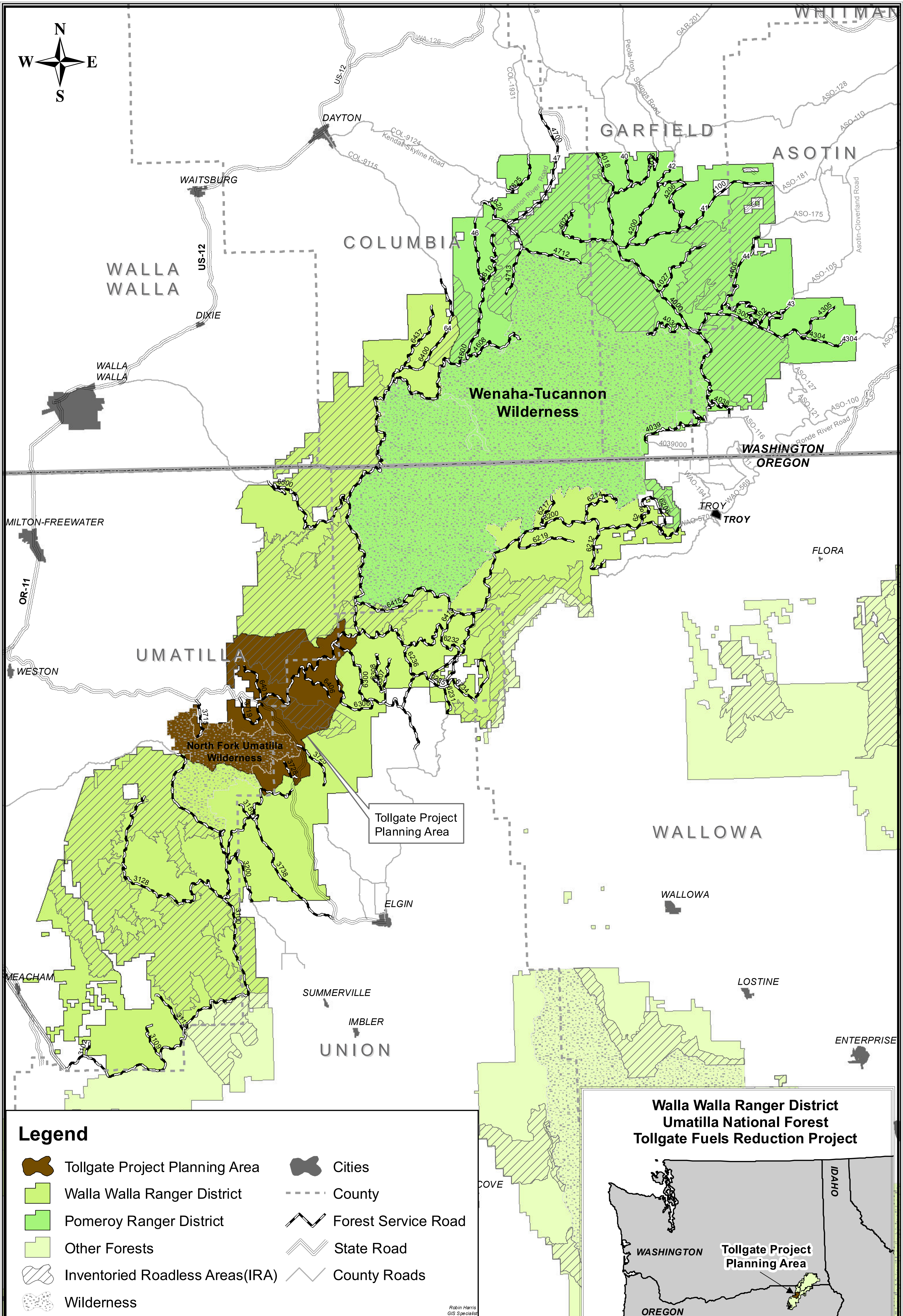
| Potential Wilderness Area Identifier (Polygon ID) | Planning Project Area Acreage (rounded) | PWA Analysis Area Acreage (rounded) |
|---|---|---|
| Lookingglass PWA (consists of the Lookingglass IRA and PWA contiguous to the IRA) | 3,660** | 5,917 ** |
| Walla Walla River PWA(consists of portions of the Walla Walla River IRA and PWA contiguous to the IRA) | 7,248** | 7,248** |
| PWA contiguous with North Fork Umatilla Wilderness | 1,151** | 1,151** |
| Isolated PWA (polygon 362) | 1,070** | 1,087** |
| **Total PWA** | **13,129**** | **15,403**** |

** This number does not include polygons less than one acre in size.

**Table H-1D; Summary of inventoried lands for the Tollage Fuels Reduction Project**

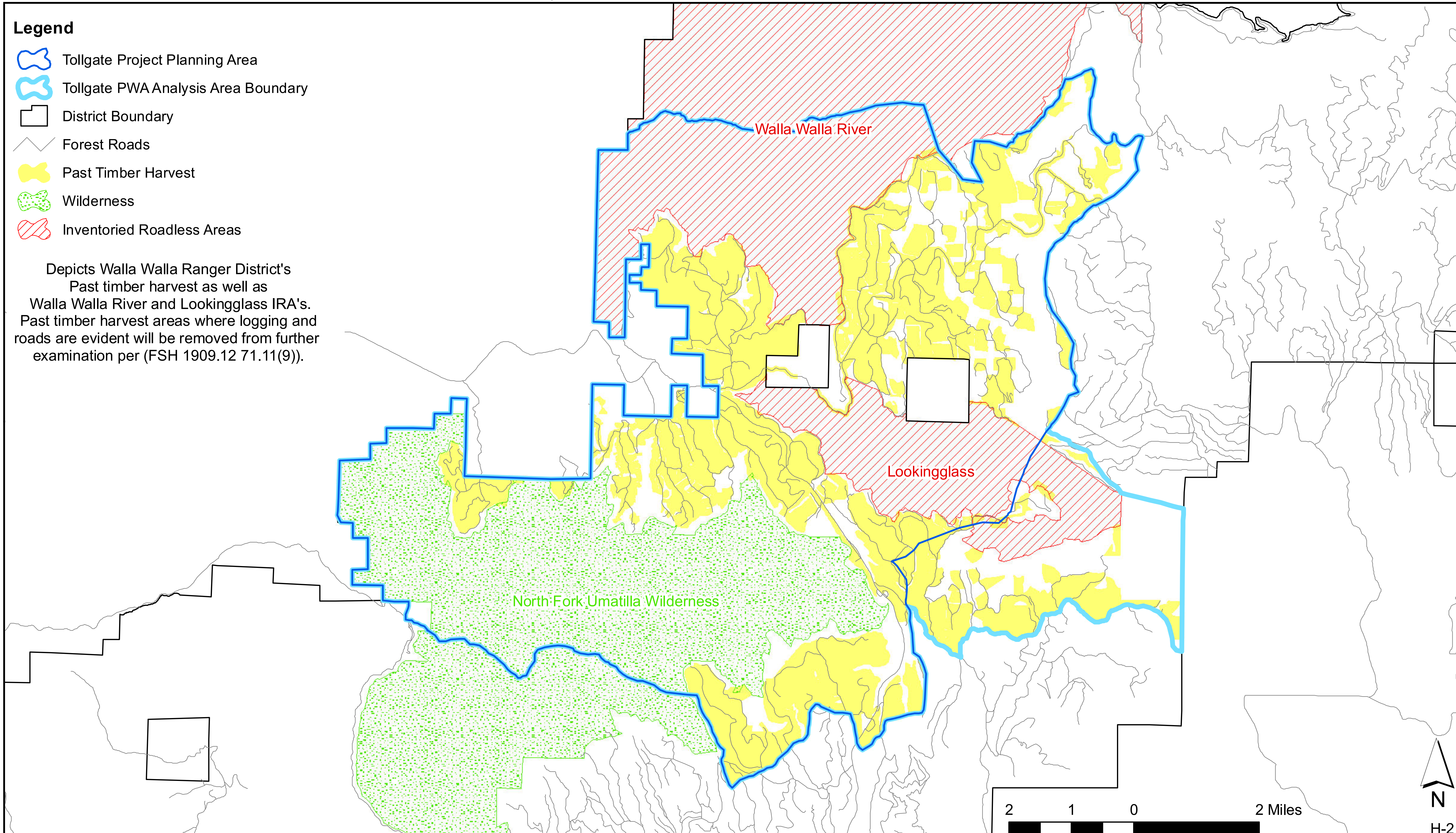
| | NF Umatilla Wilderness | PWA contiguous with NF Umatilla | Lookingglass PWA | Walla Walla River PWA | Isolated PWA polygons | Other Undeveloped Lands | Developed Lands (evidence of past harvest and/or roads) | **Total (Acres)** |
|---|---|---|---|---|---|---|---|---|
| Tollgate Project Planning Area | 12,571 | 1,151 | 3,660 | 7,248 | 1,070 | 2,584 | 18,180 | **46,464** |
| PWA Analysis Area | 12,571 | 1,151 | 5,917 | 7,248 | 1,087 | 3,709 | 20,601 | **52,284** |

Tollgate Fuels Reduction Project - Inventory of Potential Wilderness Areas
Map H-0: Roadless Context Map for Northern portion of Umatilla National Forest



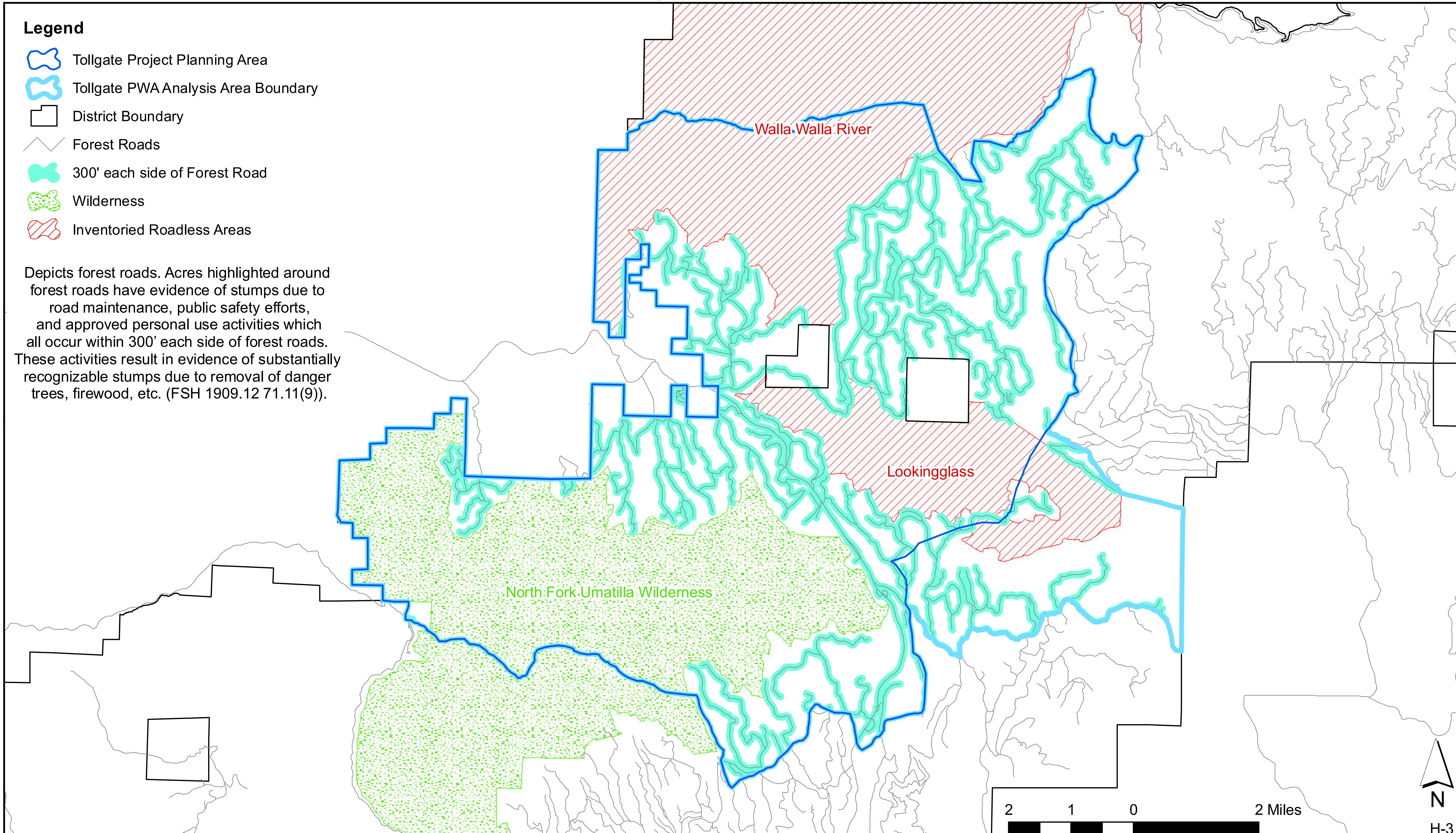
# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

## Map H-2: Removal of Past Timber Harvest Area



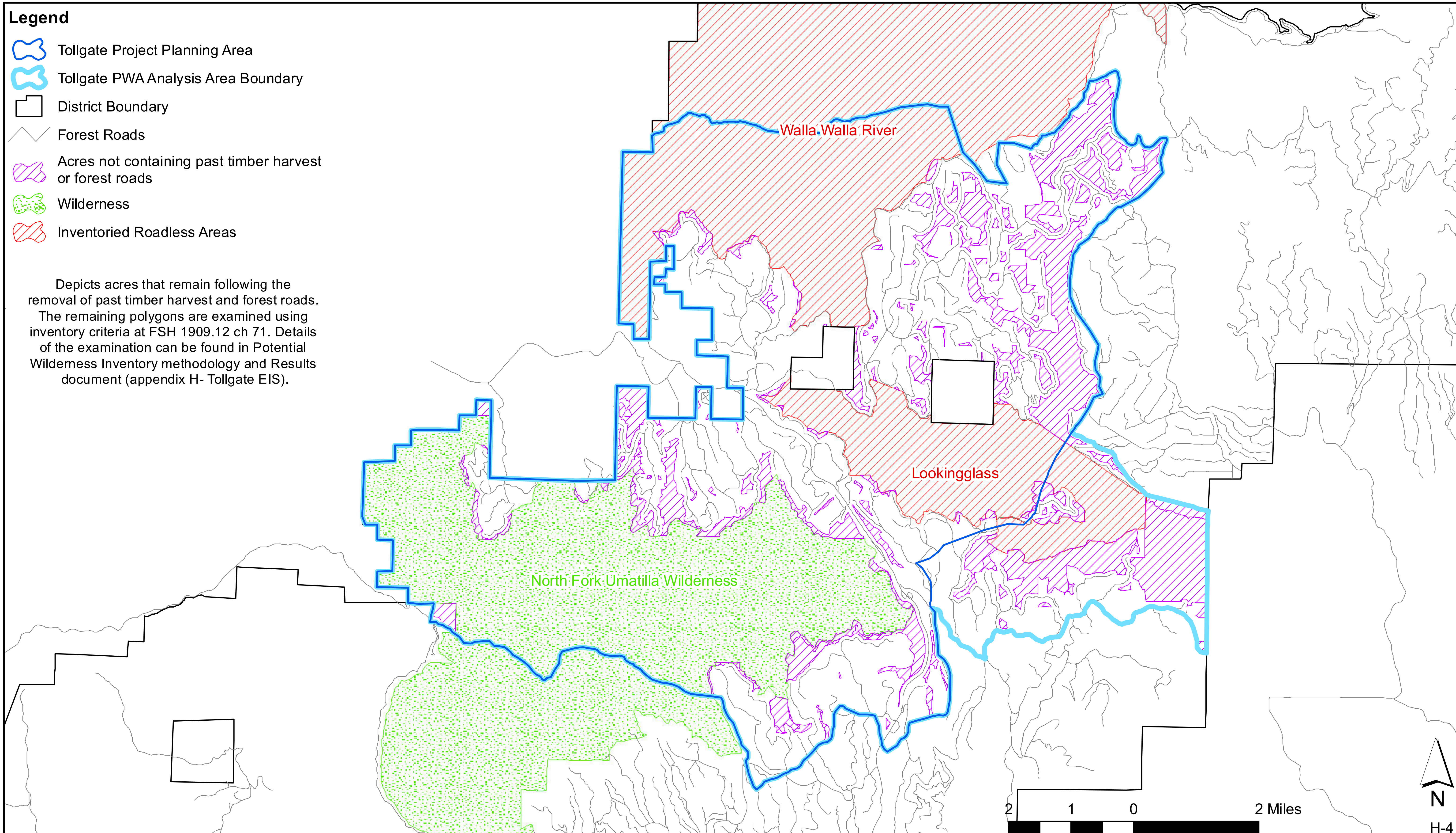
# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

## Map H-3: Forest Roads



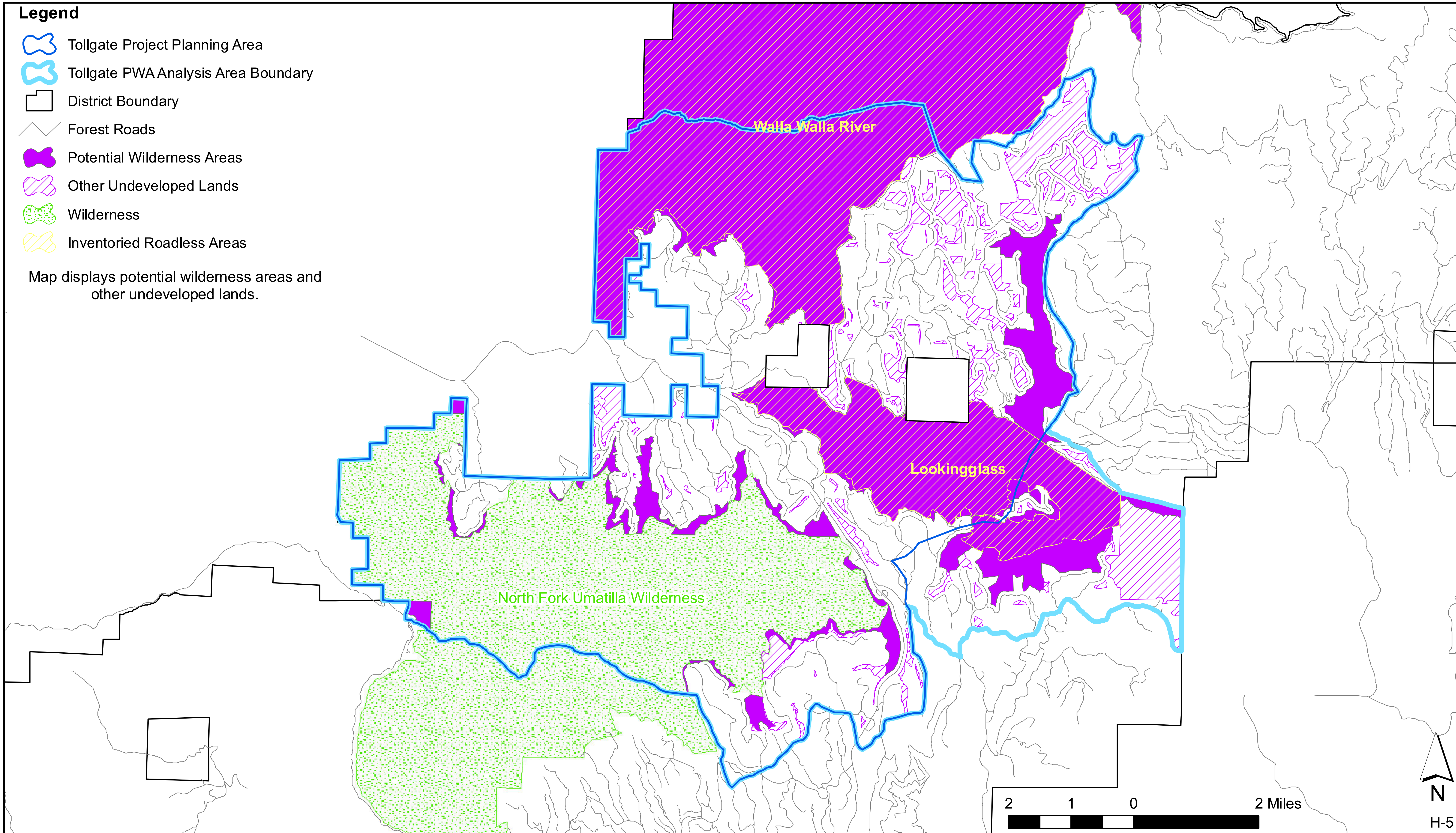
# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

## Map H-4: Acres not containing Past Timber Harvest or Forest Roads

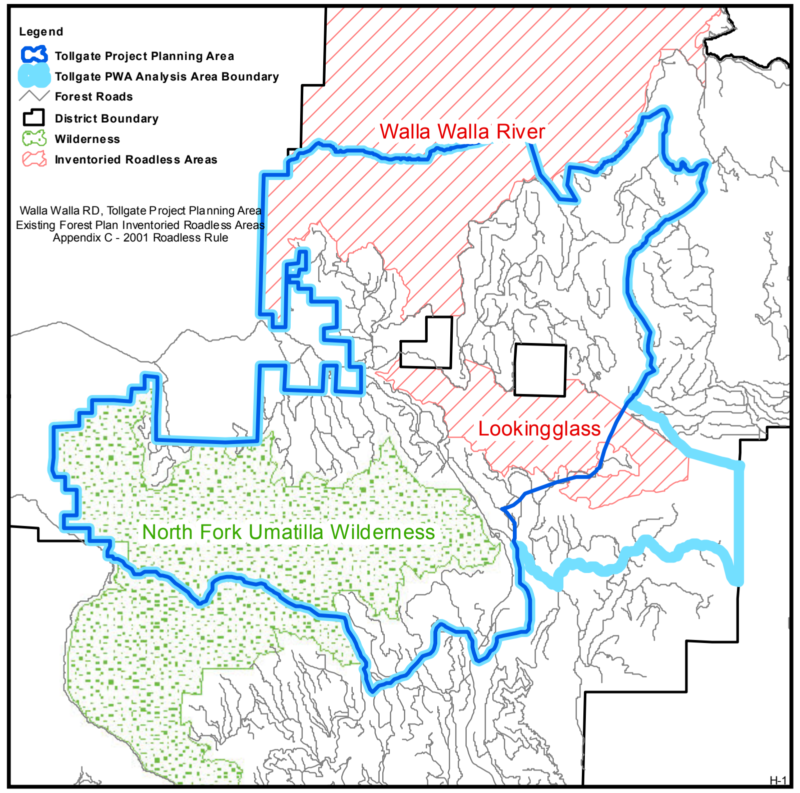


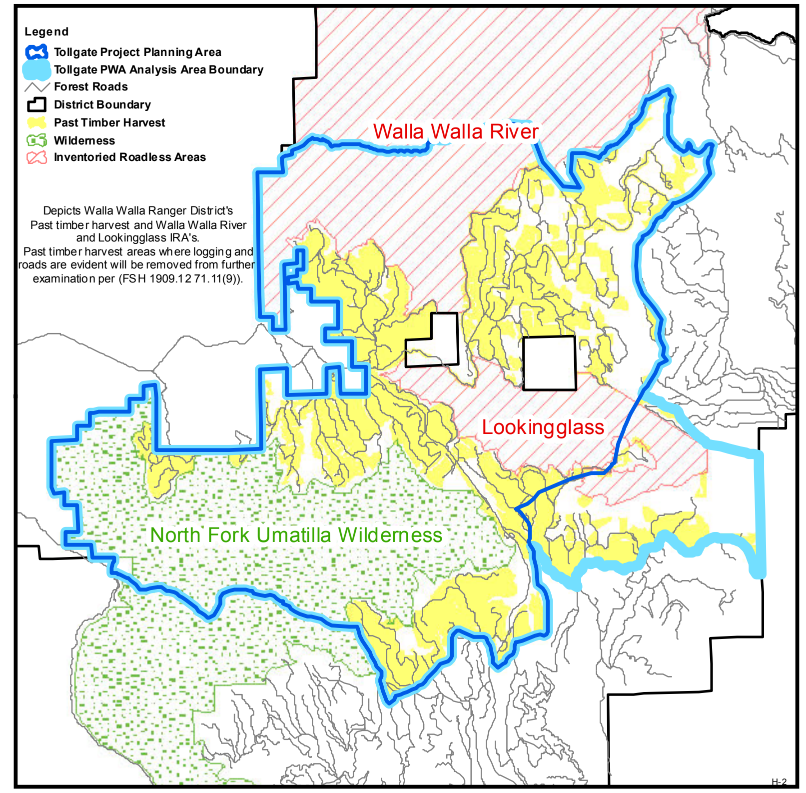
# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

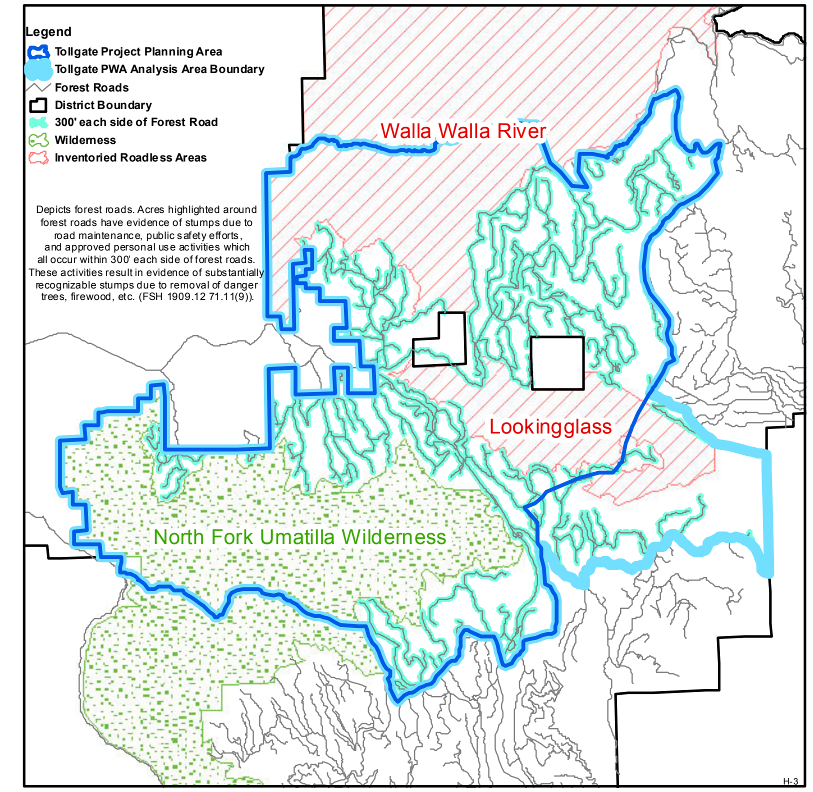
## Map H-5: Forest Service Inventory of Potential Wilderness Areas

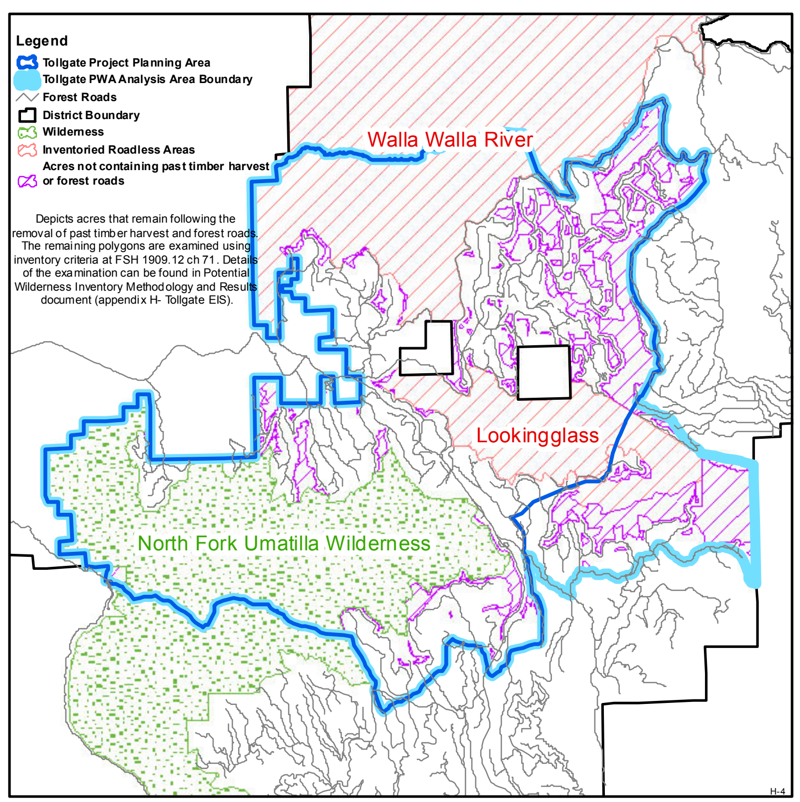


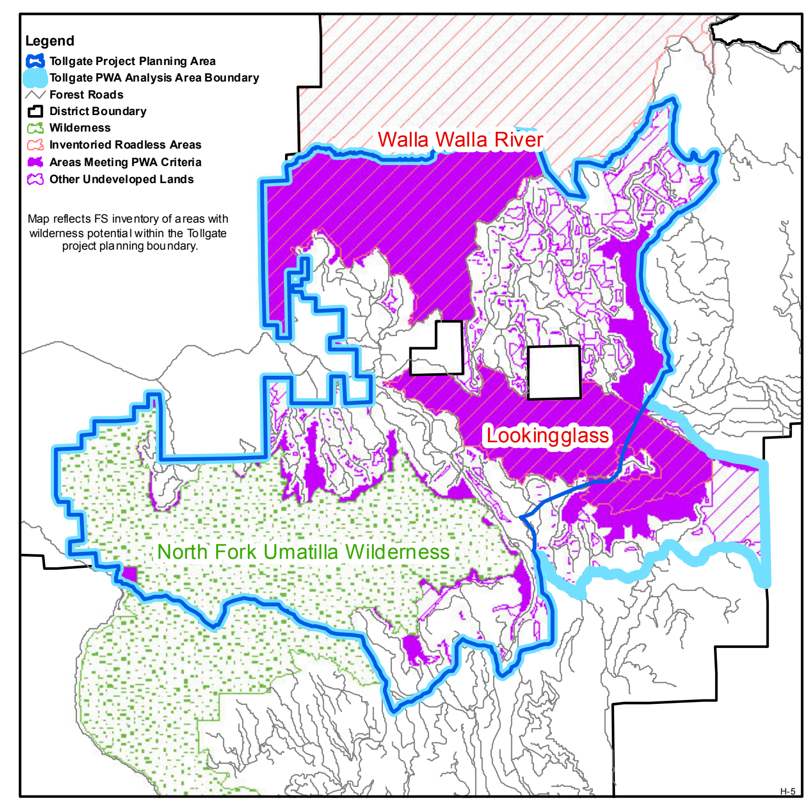
# Tollgate Fuels Reduction Project
# Potential Wilderness Inventory

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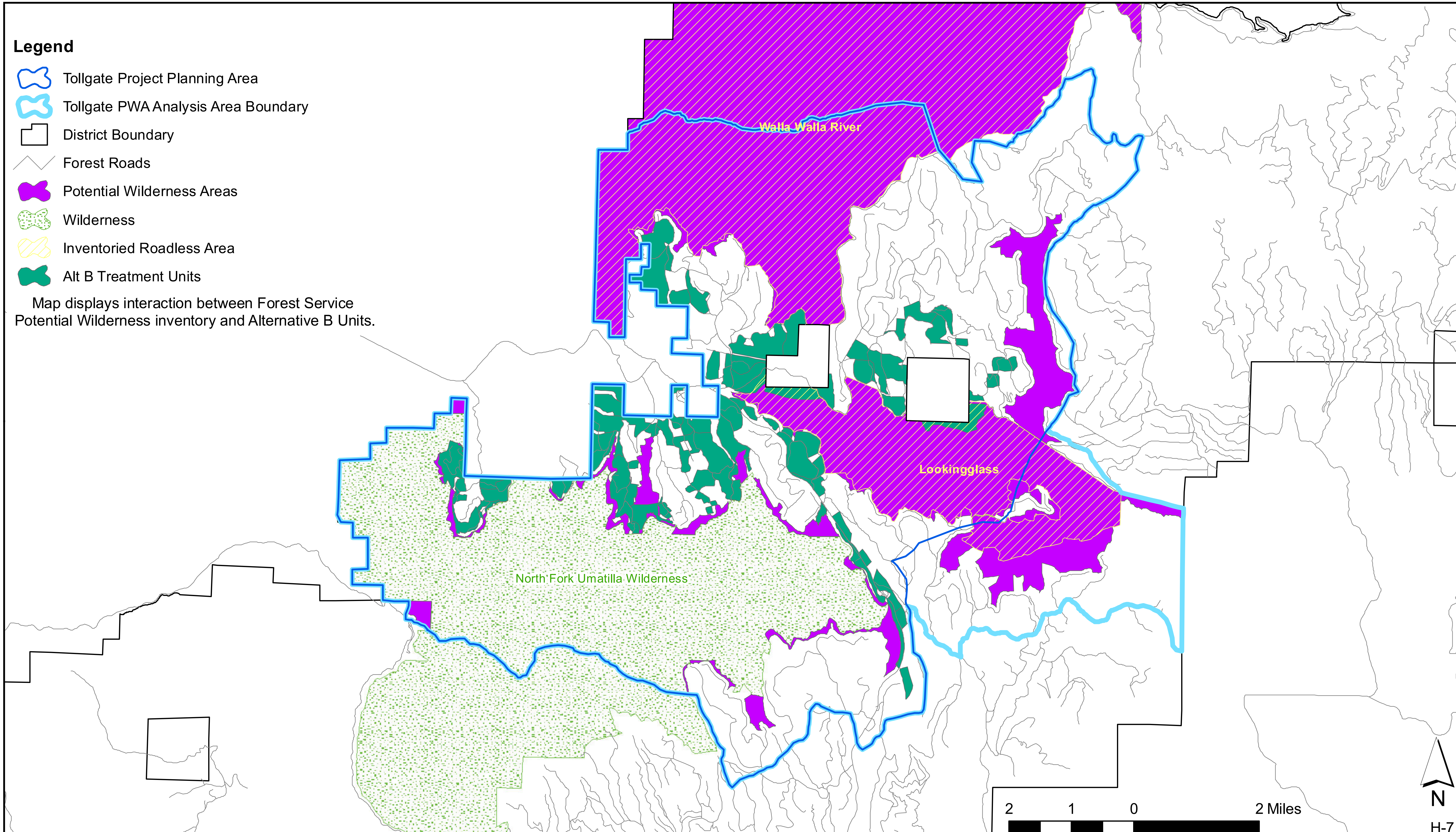
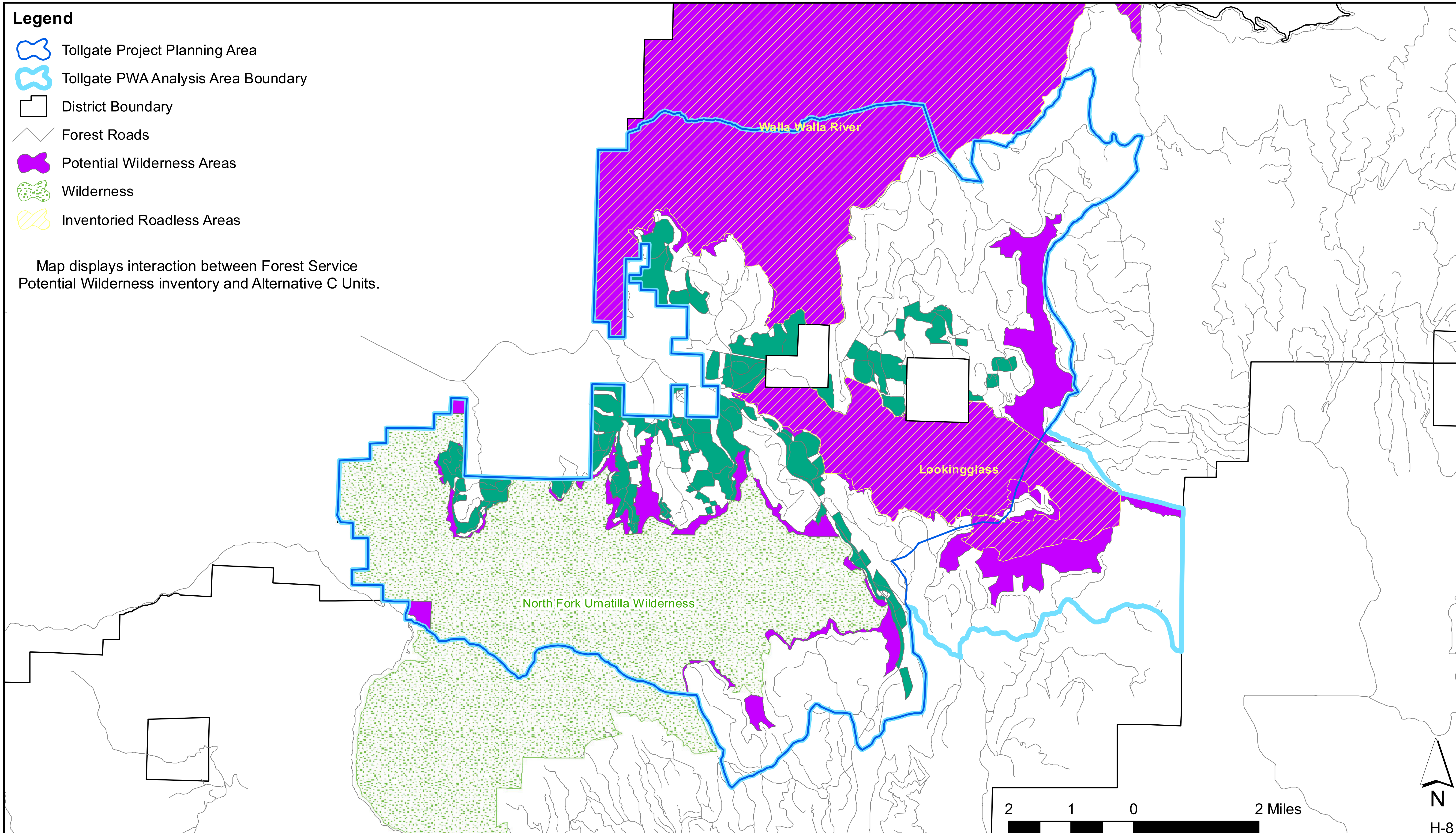
# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

## Map H-7: Interaction between PWA and Alternative B Units



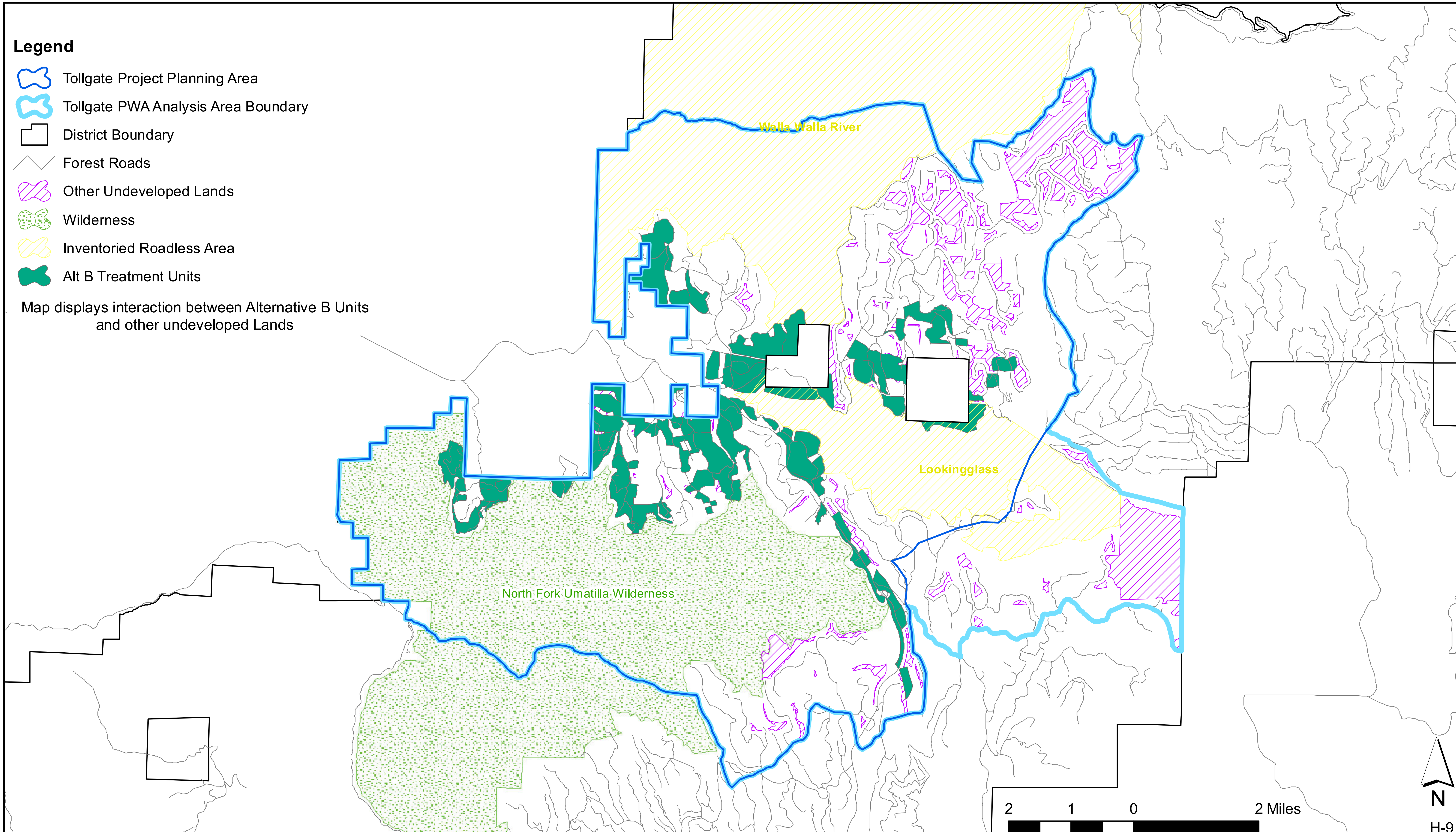
# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

## Map H-8: Interaction between PWA and Alternative C Units

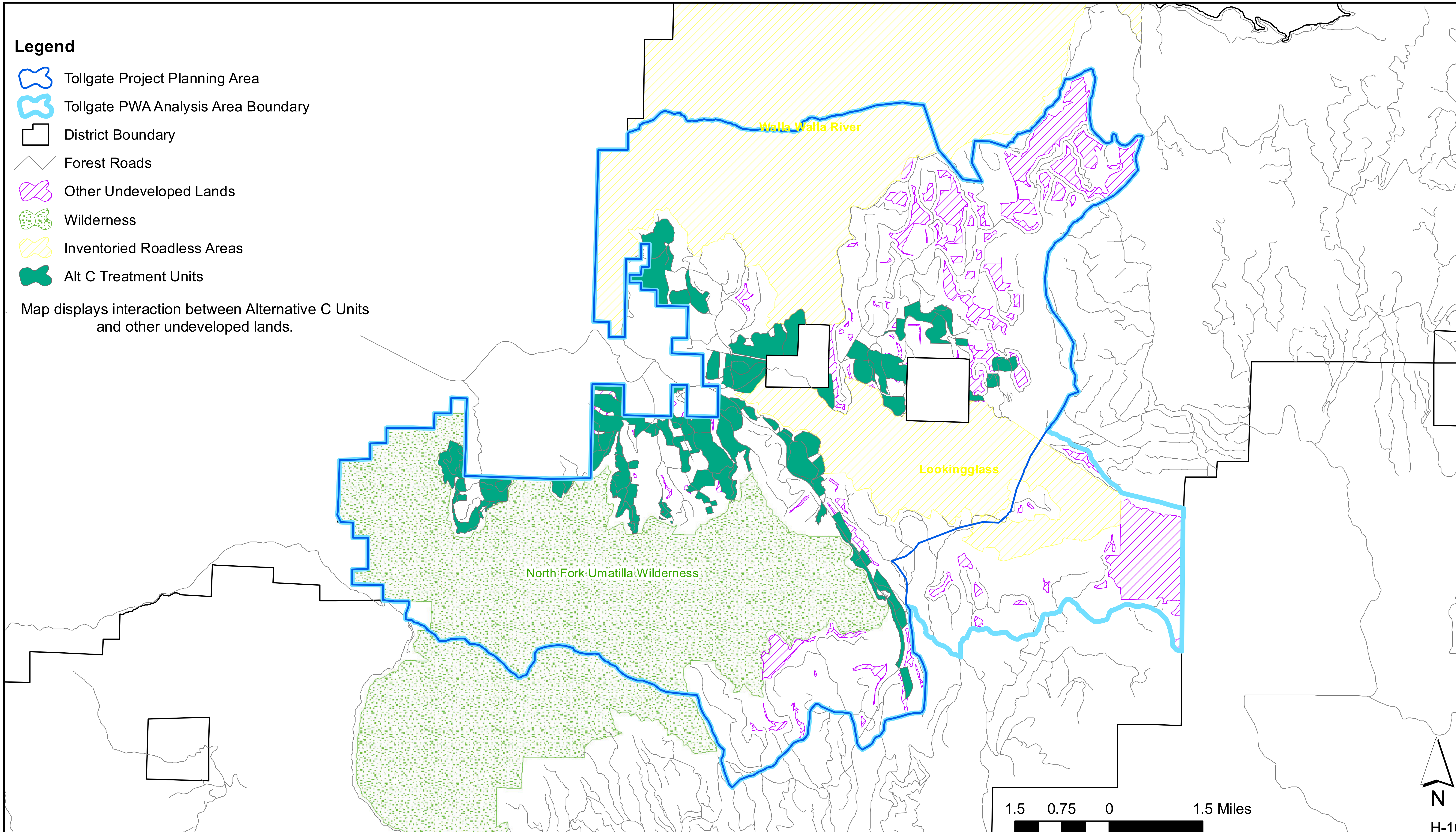


# Tollgate Project Planning Area - Inventory of Potential Wilderness Areas

## Map H-9: Interaction between Other Undeveloped Lands and Alternative B Units



Tollgate Project Planning Area - Inventory of Potential Wilderness Areas
Map H-10: Interaction between Other Undeveloped Lands and Alternative C Units



# APPENDIX I

## CONSIDERATION OF MAPS
## SUBMITTED BY
## Hells Canyon Preservation Council (HCPC)

# Appendix I

## Consideration of Roadless Maps submitted by the Public

This appendix displays how the Forest Service considered the maps presented by interested parties which reported to show acres within the planning area that contained ‘roadless’ characteristics. During project scoping Hells Canyon Preservation Council (HCPC) supplied GIS information showing their determinations of acres showing ‘roadless’ characteristics. To date, only HCPC has provided such information for the Tollgate project. An index of maps included in this appendix are listed below:

**Index of Maps**



**Background:**

HCPC submitted written comments (project file) about the ‘roadless issue’ in response to our scoping letter on the Tollgate Fuels Reduction project. Their letter included maps with polygons they present as roadless using inventory criteria and methods they developed for their purposes. They asked the Forest Service to consider the impacts to roadless characteristics within the polygons they inventoried and submitted as roadless.

The HCPC map and comment letter describe their polygons using many different terms including, but not limited to, inventoried roadless areas, roadless, unroaded, roadless expanse, and un-inventoried roadless. Some acres on both maps agree and overlap. Portions of the polygons submitted do not coincide with polygons on Forest Service maps (Appendix H). HCPC did not provide the forest service with inventory criteria they used to develop their maps submitted during public comment.

Confusion surrounds this issue because there are conflicts between Forest Service maps and the map presented by HCPC. Each map has its own history of genesis; these maps appear to use similar terms with different definitions; use different terms altogether; and, based on different map products, and appear to have different methodology and criteria used to inventory the land. Confusion continues when HCPC asks the Forest Service to disclose impacts to ‘roadless characteristics’ on lands the Forest Service determined do not meet agency inventory criteria.

In a related example, this EIS discloses impacts to a number of resources sensitive to the construction of new forest roads or from our system of existing roads.  A road is defined and criteria and methods for inventorying a road conform to agency policy.  Definitions and inventory criteria do not change project to project, Forest to Forest; they are common agency-wide.  It would not be reasonable for a single individual or group to assert their own definition of a road or how to inventory a road system and then ask the Forest Service to disclose the impacts of 'their road system' on resources present such as elk habitat, fish habitat, or potential wilderness areas.  Further, it is unreasonable to consider one version of inventoried forest roads to analyze impacts to elk and fish habitat and then apply a second, different version of roads in another analysis (PWA, other undeveloped lands) within the same EIS.  Inventories of resources and facilities in support of the Tollgate Fuels Reduction project have been predicated on agency policy and procedures.

These situations described above confound our ability to conduct a clear and meaningful effects analysis for the topic in the Tollgate Fuels Reduction project.

To resolve this confusion the Forest Service uses its discretion to rely on agency policy, agency definitions of terms, and agency procedures for the inventory of resources and facilities.  Inventory criteria and procedures for potential wilderness areas are found in Forest Service Handbook 1909.12, Ch 71.  Definitions and criteria used by the Umatilla National Forest to inventory potential wilderness areas are used by other national forests across the county.  The application of these procedures to the Tollgate Fuels Reduction project is found in Appendix H of this EIS.  The effects to inventoried roadless areas (IRAs), potential wilderness areas (PWAs), and other undeveloped lands were based on maps and polygons created using agency inventory procedures (Appendix H) and are considered and disclosed in Chapter 3 of the EIS titled '*Wilderness and Undeveloped Lands*'.

**Methodology and Discussion:**

The following narrative describes how HCPC maps were considered in the Tollgate Fuels Reduction EIS NEPA process.

1. HCPC polygons were mapped from *their* digital files identified as Blues_rdls1.20.2010. Map I-0. Approximately 15,067 acres are represented within the Tollgate Fuels Reduction Project planning area.

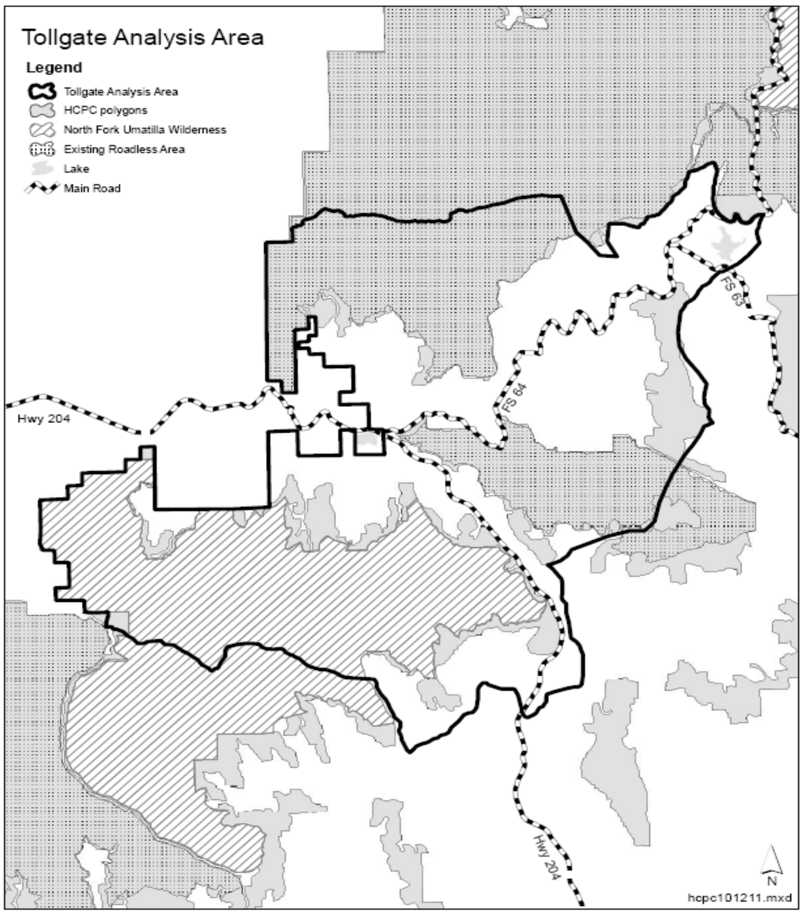


**Table I-1 Comparison of HCPC's polygons and Forest Service inventory of PWAs, Other Undeveloped Lands and Forest Plan Management Area Allocations within Tollgate Fuels Reduction Project Planning Area**

| Management Area | Acres of PWA located in each MA | Percent of PWA in each MA | Acres of Other Undeveloped Lands located in each MA | Percent of Other Undeveloped Land in each MA | Acres of HCPC inventory located in each MA | Percent of HCPC Inventory in each MA |
|---|---|---|---|---|---|---|
| A2 | 3,061 | 23.3 | 0 | 0 | 3,080 | 20.4 |
| A3 | 635 | 4.8 | 960 | 37.1 | 927 | 6.2 |
| A4 | 76 | <1 | 0 | 0 | 77 | <1 |
| A5 | 9 | <1 | 1 | <1 | 231 | 1.5 |
| A6 | 157 | 1.1 | 384 | 14.9 | 266 | 1.7 |
| A9 | 62 | <1 | 32 | <1 | 73 | <1 |
| B1 | 0 | 0 | 0 | 0 | 10 | <1 |
| C1 | 1,466 | 11.1 | 18 | <1 | 1,560 | 10.4 |
| C4 | 547 | 4.1 | 488 | 18.9 | 509 | 3.4 |
| C5 | 76 | >1 | 60 | 2.3 | 86 | <1 |
| E2 | 1,626 | 12.4 | 641 | 24.8 | 2,756 | 18.3 |
| F4 | 5,411 | 41.2 | 0 | | 5,410 | 36 |
| Total | 13,126 | | 2,584 | | 15,066 | |
| Rounded | 13,128 | 100 | | 100 | 15,067 | 100 |

2. Map I-1 was created that compared HCPC's polygons to locations of other undeveloped lands, IRA's, PWAs, and forest roads.

Table I-2 displays the acres of overlap of HCPC's polygons with IRA's, PWAs, other undeveloped lands, forest roads and past harvest on National Forest System Lands within the project planning area.

**Table I-2 Overlap of HCPC's Polygons with PWAs, Other Undeveloped Lands, Roads, And Past Harvest**

| | **PWAs (acres)** | **Other Undeveloped Lands* (acres)** | **Forest Roads within Polygon (miles)** | **Areas with evidence of stumps and Past Harvest (acres)** |
|---|---|---|---|---|
| **HCPC** | 12,871 | 286 | 1.45 | 1,527 |

The affected environment of other undeveloped lands is disclosed in the EIS, Chapter 3 in the section titled *Wilderness and Undeveloped Lands*. The affected environment of other undeveloped lands is based on maps and acres described in Chapter 3, and Appendix H.

Descriptions for the affected environment of other undeveloped lands applies to the acres of HCPC's polygons that overlap with other undeveloped lands polygons displayed in Map I-2, and Table I-2.

3. Maps listed below were created that compared HCPC's polygons to the locations of project activities proposed in Alternatives B and C, of the Tollgate Fuels Reduction project.

    a. Map I-2: Consideration of HCPC polygons and Alternative B units
    b. Map I-3: Consideration of HCPC polygons and Alternative C units

    Table I-3 displays the acres of HCPC's polygons in comparison to the fuels reduction treatments proposed in Alternatives B and C.

    **Table I-3 Proposed Activities within HCPC's Polygons by Action Alternative**

| | Treatment (acres) | |
|---|---|---|
| | **Alt. B** | **Alt. C** |
| **HCPC** | 837 | 529 |

    No activities are proposed in the Walla Walla River IRA, Walla Walla River PWA or in the isolated PWA polygon 362 (1,087 acres).

    Under Alternative B approximately 220 acres in the Lookingglass PWA will be directly affected by fuels treatments (113 acres are in the Lookingglass IRA).

    Under Alternative C approximately 11 acres in the Lookingglass PWA will be directly affected by fuels treatments (0 acres are in the Lookingglass IRA).

    The descriptions of environmental effects to the 'intrinsic physical and social values' of other undeveloped lands applies to the acres of the HCPC's polygons that overlap with other undeveloped lands polygons displayed in maps I-3 and I-4, and Table I-2 and I-3. Fuels treatments proposed within other undeveloped lands and environmental effects are described in the Chapter 3.

4. Lastly, about 1,528 acres of HCPC's polygons within the Tollgate Fuels Reduction project planning boundary do not overlap other undeveloped lands or PWAs. These remaining acres are essentially developed because they contain evidence of stumps along forest roads and evidence of past timber harvest.

    Activities in these remaining essentially developed acres of land applies to the acres of the HCPC's polygons that do not overlap with other undeveloped lands polygons or PWAs as displayed in maps I-HCPC-Alt B and I-HCPC-Alt C. The environmental effects to the remaining essentially developed acres of land are disclosed throughout all other resource sections of Chapter 4.

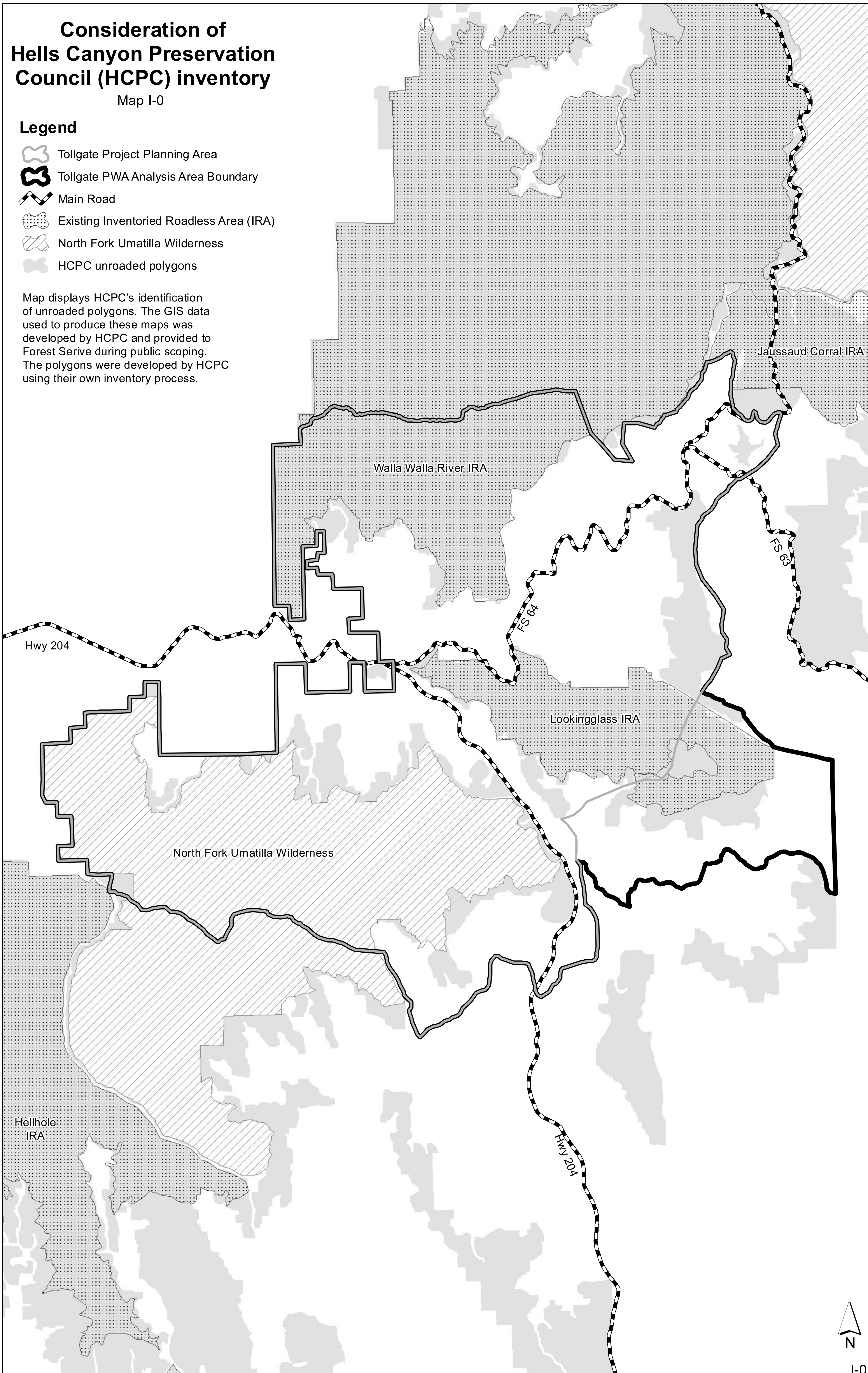
# Consideration of Hells Canyon Preservation Council (HCPC) inventory

Map I-0

## Legend

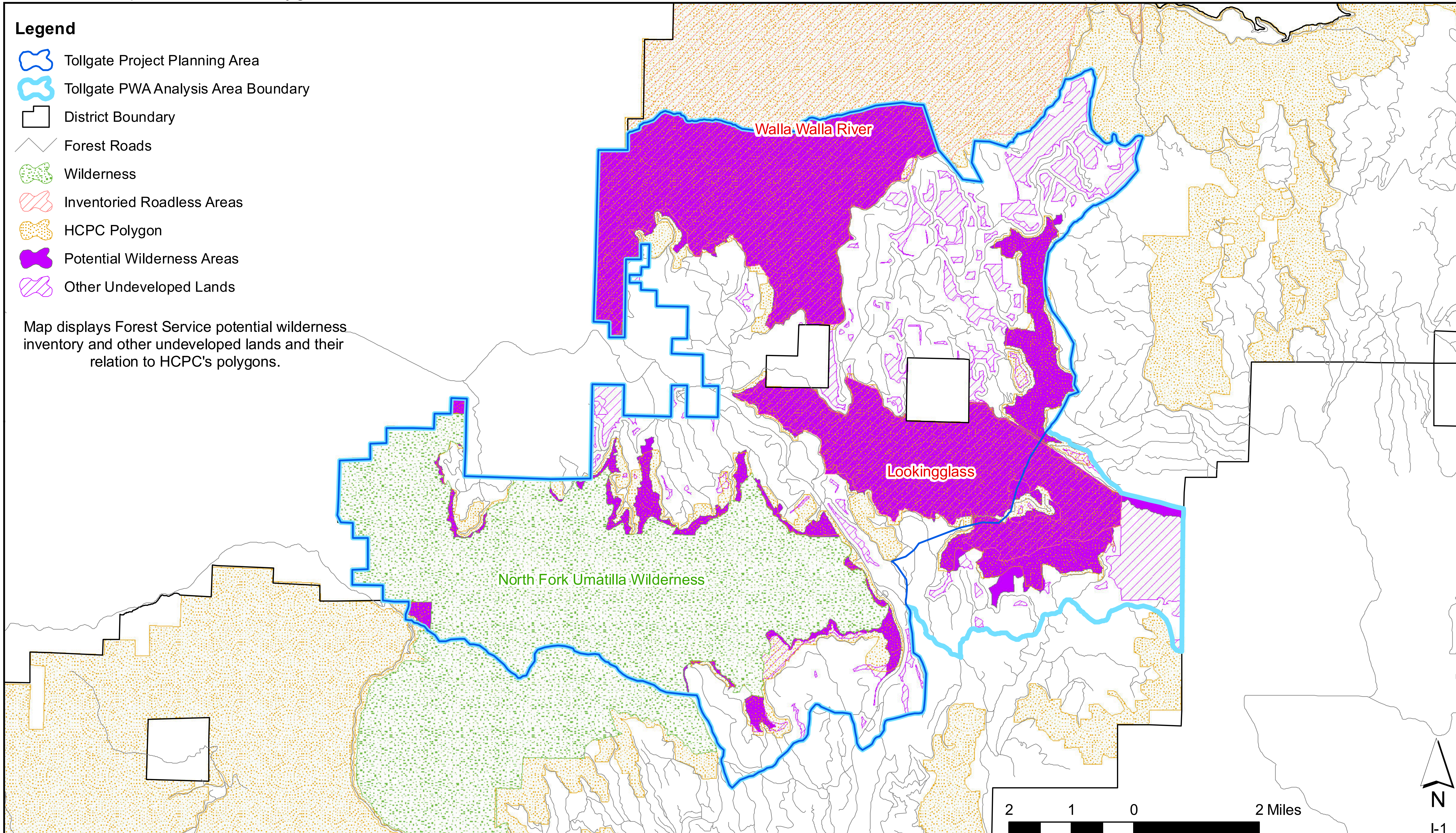
- Tollgate Project Planning Area
- Tollgate PWA Analysis Area Boundary
- Main Road
- Existing Inventoried Roadless Area (IRA)
- North Fork Umatilla Wilderness
- HCPC unroaded polygons

Map displays HCPC's identification of unroaded polygons. The GIS data used to produce these maps was developed by HCPC and provided to Forest Serive during public scoping. The polygons were developed by HCPC using their own inventory process.



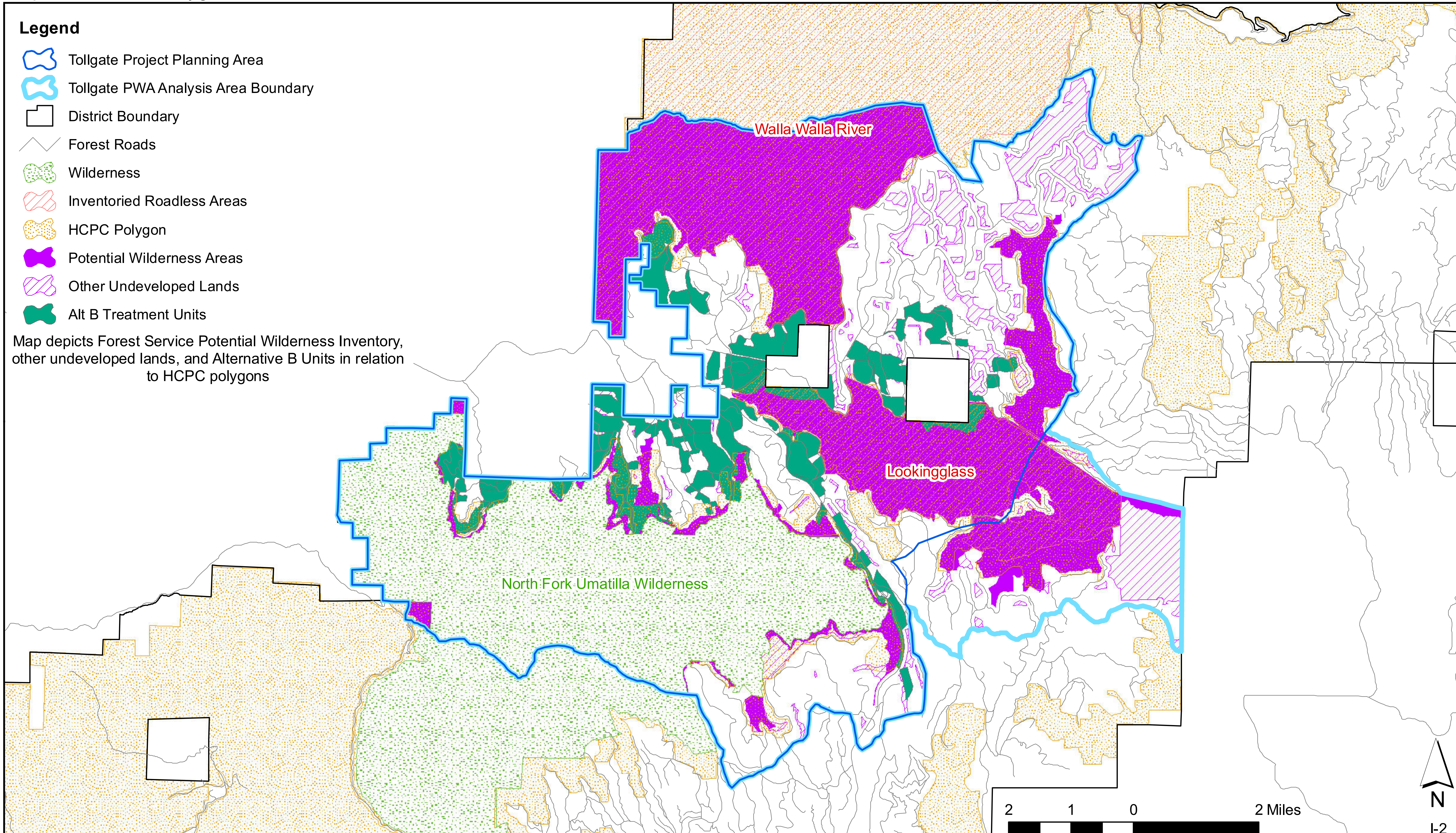
Tollgate Project Planning Area - Inventory of Potential Wilderness Areas and consideration of HCPC polygons

Map I-1: HCPC's Polygon in relation to Inventoried Roadless Areas, Potential Wilderness Areas, Other Undeveloped Lands, and Forest Roads.



Tollgate Project Planning Area - Inventory of Potential Wilderness Areas and consideration of HCPC polygons

Map I-2: HCPC's Polygon in relation to Inventoried Roadless Areas, Potential Wilderness Areas, Other Undeveloped Lands, Forest Roads and Alternative B activities



Tollgate Project Planning Area - Inventory of Potential Wilderness Areas and consideration of HCPC polygons

Map I-3: HCPC's Polygon in relation to Inventoried Roadless Areas, Potential Wilderness Areas, Other Undeveloped Lands, Forest Roads and Alternative C activities